

# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686  
Task Number: NA

Test Station No.: 7G  
Specific Gravity: 2.710

File Name: B-2359\_UD5b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = \_\_\_\_\_ ppm

## Consolidation Stress Summary and Loading Summary

| Test Stage:                                | Max. Stress | Pre-Shear | Post Cyclic | X | Static Strain Rate =                                | NA   | (%/hr or ) |
|--------------------------------------------|-------------|-----------|-------------|---|-----------------------------------------------------|------|------------|
| Nominal Vertical Stress, $\sigma'_v$ (ksf) | NA          | 5.04      | NA          |   | Cyclic Rate (Hz):                                   | 0.1; | 1; Other = |
| Axial/Vertical Force, $P_{v,n}$ (lbf)      | NA          | NA        | NA          |   | During/End of Loading                               |      |            |
| Horizontal Force, $P_{h,n}$ (lbf)          | NA          | 0         | NA          |   | Change in Height, $\Delta H_{L,n}$ (mm)             |      |            |
| Nominal OCR                                | NA          | NA        | NA          |   | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ) |      |            |
| $t_c$ (ON, days, hrs)                      | NA          | 1.13 days | NA          |   | Post Cy. Displ. Reset to Null Position:             |      |            |
|                                            |             |           |             |   |                                                     | Yes; | No         |

Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp.,  $\Delta d_{h,ua}$  (mm) = NA

## Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

|                                                                          | Top, $W_{o,1}$ | Bottom, $W_{o,2}$ | Sides, $W_{o,3}$ | Avg., $W_{o,avg}$ | Selct., $W_{o,s}$ | Back Cal. |
|--------------------------------------------------------------------------|----------------|-------------------|------------------|-------------------|-------------------|-----------|
| $W_o$                                                                    | 23.43          | 22.80             | 22.73            | 22.99             | 22.99             | 25.16     |
| $S_o$                                                                    | 97.5           | 96.1              | 96.0             | 96.5              | 96.5              | 101.1     |
| Measured final mass of moist soil, $M_{t,at}$ (g)                        |                |                   |                  |                   |                   | 131.66    |
| Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g) |                |                   |                  |                   |                   | 131.66    |

## Calculated Mass of Dry Soil (g)

|                                    |        |
|------------------------------------|--------|
| Initial Selected Water Content (%) | 22.99  |
| Initial, $M_{d,o}$                 | 106.72 |
| Final, $M_{d,at}$                  | 104.88 |
| Selected, $M_d$                    | 105.80 |

## Initial Back Cal. Specific Gravity (TS):

|                              |  |
|------------------------------|--|
| Selected $S_o$ (%)           |  |
| Selected $W_o$ (%)           |  |
| Specific Gravity, $G_{s,bc}$ |  |

## Height/Volume Change Summary

| Variation in Height & Volume During Consol.                                              | During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$ | During Rebound to $\sigma'_{v,c}$ | Specimen Unloaded After Test To |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------|---------------------------------|
| Stress Units (ksf)                                                                       | 5.040                                                          | NA                                | NA                              |
| Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up |                                                                |                                   |                                 |
| Delta Def. Read., $\Delta d_{ar,n}$ (mm)                                                 | 0.301                                                          |                                   |                                 |
| Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)                                        | 0.000                                                          |                                   |                                 |
| Corr. Total Def. $\Delta H_{c,n}$ (mm)                                                   | 0.301                                                          |                                   |                                 |
| $\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )                                      | 1.05                                                           |                                   |                                 |
| $\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )                                   | 1.05                                                           |                                   |                                 |
| $\Delta V_n$ using burette meas. (cm <sup>3</sup> )                                      | -0.10                                                          |                                   |                                 |
| Selected $\Delta V_n$ (cm <sup>3</sup> )                                                 | 1.05                                                           | NA                                | NA = $\Delta V_{UL}$            |
| After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)              |                                                                |                                   | NA                              |

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

## Calculation of $\Delta V_c$ by Different Procedures

| By Selected Volumes             |      | By Change in Mass                                          |       |
|---------------------------------|------|------------------------------------------------------------|-------|
| $\Delta V_c$ (cm <sup>3</sup> ) | 1.05 | $\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$ |       |
| By Cal. Height & App. Area      |      | $\Delta V_c$ (cm <sup>3</sup> )                            | -0.40 |
| $\Delta V_c$ (cm <sup>3</sup> ) | 1.05 | By Saturation = 100% and Spec. Unloaded to 0 Stress        |       |
| By Cal. Ht. & Init. Spec. Area  |      | $\Delta V_c$ (cm <sup>3</sup> )                            | NA    |
| $\Delta V_c$ (cm <sup>3</sup> ) | 1.05 |                                                            |       |

## Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

|                                                 |        |
|-------------------------------------------------|--------|
| Assumed Saturation (%)                          | 100.00 |
| Back Cal. WC before Loading, $W_{c,bc}$ (%)     | 23.35  |
| Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%) | NA     |

|                                     |                                   |       |                          |        |                           |      |                                         |    |
|-------------------------------------|-----------------------------------|-------|--------------------------|--------|---------------------------|------|-----------------------------------------|----|
| <b>Consolidation &amp; Preshear</b> | $\Delta V_c$ (cm <sup>3</sup> ) = | 1.05  | $\Delta H_c$ (mm) =      | 0.301  | $\varepsilon_{a,c}$ (%) = | 1.62 | $\Delta V_{c,max}$ (cm <sup>3</sup> ) = | NA |
|                                     | $V_c$ (cm <sup>3</sup> ) =        | 63.86 | $H_c$ (mm) =             | 18.299 | $\varepsilon_{v,c}$ (%) = | 1.62 | $\varepsilon_{ac,max}$ (%) =            | NA |
|                                     | $A_c$ (cm <sup>2</sup> ) =        | 34.90 | $\Delta \gamma_c$ (mm) = | NA     | $\gamma_c$ (%) =          | NA   | Preshear: $\gamma_{ua}$ (%) =           | NA |

## Summary of Specimen Physical Properties:

| Specific Gravity: $G_s = 2.710$ Measured | Height (mm) | Volume (cm <sup>3</sup> ) | Area (cm <sup>2</sup> ) | Water Content (%) | Total Unit Weight (pcf) | Dry Unit Weight (pcf) | Saturation (%) | Void Ratio, e |
|------------------------------------------|-------------|---------------------------|-------------------------|-------------------|-------------------------|-----------------------|----------------|---------------|
| Condition:                               |             |                           |                         |                   |                         |                       |                |               |
| Initial (as trimmed)                     | 18.600      | 64.91                     | 34.90                   | 24.1              | 126.2                   | 101.7                 | 98.8           | 0.663         |
| After to $\sigma'_{v,c}$                 | 18.299      | 63.86                     | 34.90                   | 23.4              | 127.6                   | 103.4                 | 100.0          | 0.636         |
| Consol.: to $\sigma'_{v,max}$            | NA          | NA                        | NA                      | NA                | NA                      | NA                    | NA             | NA            |

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 2.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 7G File Name: B-2359\_UD5b  
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

|                                                    |                                           |                                |                                   |                                  |                                           |                                    |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|------------------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer =            |
| Boring No.: B-2359UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =                       |
| Sample No.: UD-5                                   | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =                       |
| Depth (ft): 40.0 - 41.7                            | Specimen No.: B                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: | U <sub>ni</sub> (%) = Dia. (in.) = |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                             | % Comp. = ± Opt. =                 |

|                     |                                                        |                                                     |                                          |                                                                   |                                                     |                                      |
|---------------------|--------------------------------------------------------|-----------------------------------------------------|------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> K <sub>o</sub> at: | <input checked="" type="checkbox"/> Incremental CRS | <input type="checkbox"/> Anisotropic at: | <input type="checkbox"/> Inclined Stress Path, K <sub>c,DSS</sub> | <input type="checkbox"/> Used Automated System      | Remarks:                             |
| Loading Conditions: | <input checked="" type="checkbox"/> Static             | <input checked="" type="checkbox"/> Strain          | <input type="checkbox"/> Creep           | <input checked="" type="checkbox"/> Const. Vol./Ht                | <input checked="" type="checkbox"/> Without - Water | <input type="checkbox"/> Cyclic (Hz) |
|                     | <input type="checkbox"/> Dynamic                       | <input type="checkbox"/> Stress                     | <input type="checkbox"/> Post Cyclic     | <input type="checkbox"/> Drained                                  | <input type="checkbox"/> With - Bath                | Rate: 0.1; 1; Other:                 |

| Summary of Specimen Physical Properties              |                |                              |                            |                         |                               |                             |                   |          |           |                  |
|------------------------------------------------------|----------------|------------------------------|----------------------------|-------------------------|-------------------------------|-----------------------------|-------------------|----------|-----------|------------------|
| Specific Gravity:<br>G <sub>s</sub> = 2.710 Measured | Height<br>(mm) | Volume<br>(cm <sup>3</sup> ) | Area<br>(cm <sup>2</sup> ) | Water<br>Content<br>(%) | Total<br>Unit Weight<br>(pcf) | Dry<br>Unit Weight<br>(pcf) | Saturation<br>(%) | LL<br>PL | -200<br>% | Void Ratio,<br>e |
| Condition:                                           |                |                              |                            |                         |                               |                             |                   |          |           |                  |
| Initial                                              | 18.60          | 64.91                        | 34.90                      | 24.06                   | 126.2                         | 101.7                       | 98.8              | 65       | 93.4      | 0.663            |
| After to σ' <sub>v,c</sub>                           | 18.30          | 63.86                        | 34.90                      | 23.35                   | 127.6                         | 103.4                       | 100.0             | 18       | NA        | 0.636            |
| Consol.: to σ' <sub>vc,max</sub>                     | NA             | NA                           | NA                         | NA                      | NA                            | NA                          | NA                | 47       | NA        | NA               |

| Consolidation Stress Summary and Loading Summary   |       |             |           |             |   |                                                         |  |                     |        |         |
|----------------------------------------------------|-------|-------------|-----------|-------------|---|---------------------------------------------------------|--|---------------------|--------|---------|
| Item                                               | Unit  | Max. Stress | Pre-Shear | Post Cyclic | X | Static Strain Rate = 4.8 %/hr.                          |  |                     |        |         |
| Vert. Consol. Stress, $\sigma'_{v,c}$              | (ksf) | NA          | 5.054     | NA          |   | Cyclic Rate (Hz):                                       |  | 0.1;                | 1;     | Other = |
| Induced OCR:                                       | -     | NA          | NA        | NA          |   | During/End of Loading                                   |  |                     | Static | Cyclic  |
| Axial Strain during Consol., $\epsilon_{a,c}$      | %     | NA          | 1.62      | NA          |   | Change in Height, $\Delta H_{L,n}$ (mm):                |  |                     | NA     | NA      |
| Horiz. Consol. Stress, $\tau_{h,c}$                | (ksf) | NA          | NA        | NA          |   | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ):    |  |                     | NA     | NA      |
| Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$ | -     | NA          | NA        | NA          |   | Post Cy. Displ. Reset to Null Pos.:                     |  |                     | Yes;   | No      |
| Shear Strain during Consol., $\epsilon_{h,c}$      | %     | NA          | NA        | NA          |   | Number of Loading Cycles, N = NA                        |  |                     |        |         |
| Undr. Ambient Shear Stress, $\tau_{h,u}$           | (ksf) | NA          | NA        | NA          |   | $\pm \tau_h =$ NA (ksf)                                 |  | $\pm \gamma =$ NA % |        |         |
| Undr. Ambient Shear Strain, $\epsilon_{h,u}$       | %     | NA          | NA        | NA          |   | at end of cyclic loading, $\sigma'_{v,cy,r} =$ NA (ksf) |  |                     |        |         |

|                                                                                                       |                                                                                                            |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Weight Top Cap, etc., M <sub>tc</sub> (lb): 1.16                                                      | Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: 5.054 (ksf) |
| Data corr. for M <sub>tc</sub> : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No | Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No                   |
| Wire Reinforced Membrane, Model:                                                                      | Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No        |
| <input checked="" type="checkbox"/> Regular Membrane with Rings                                       | <input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions   |
|                                                                                                       | Maximum Stress during Consol. <input type="checkbox"/>                                                     |

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

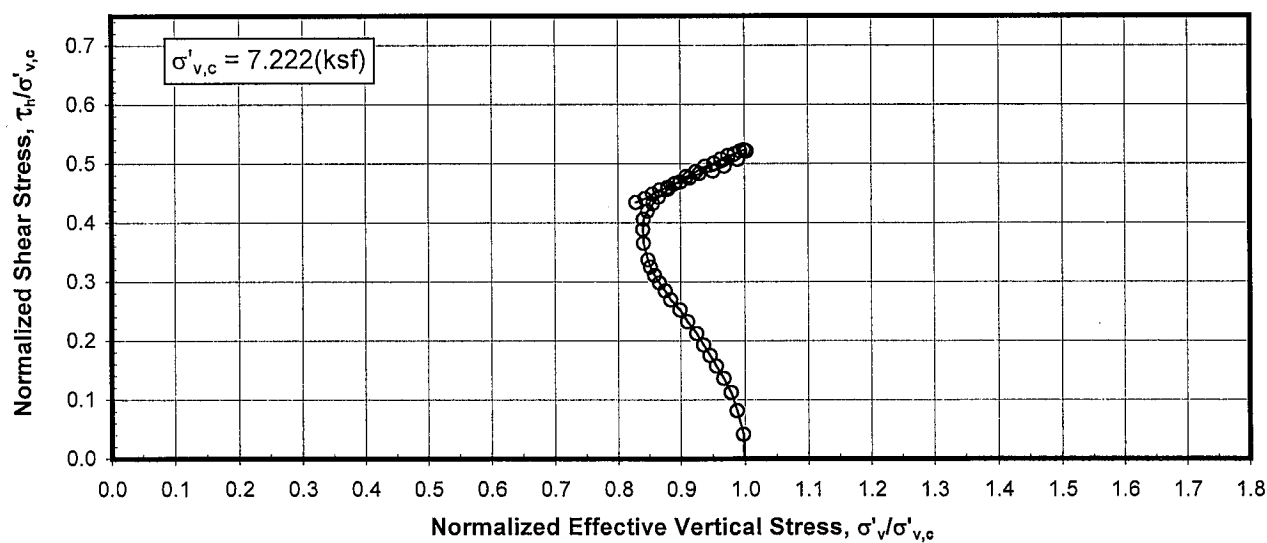
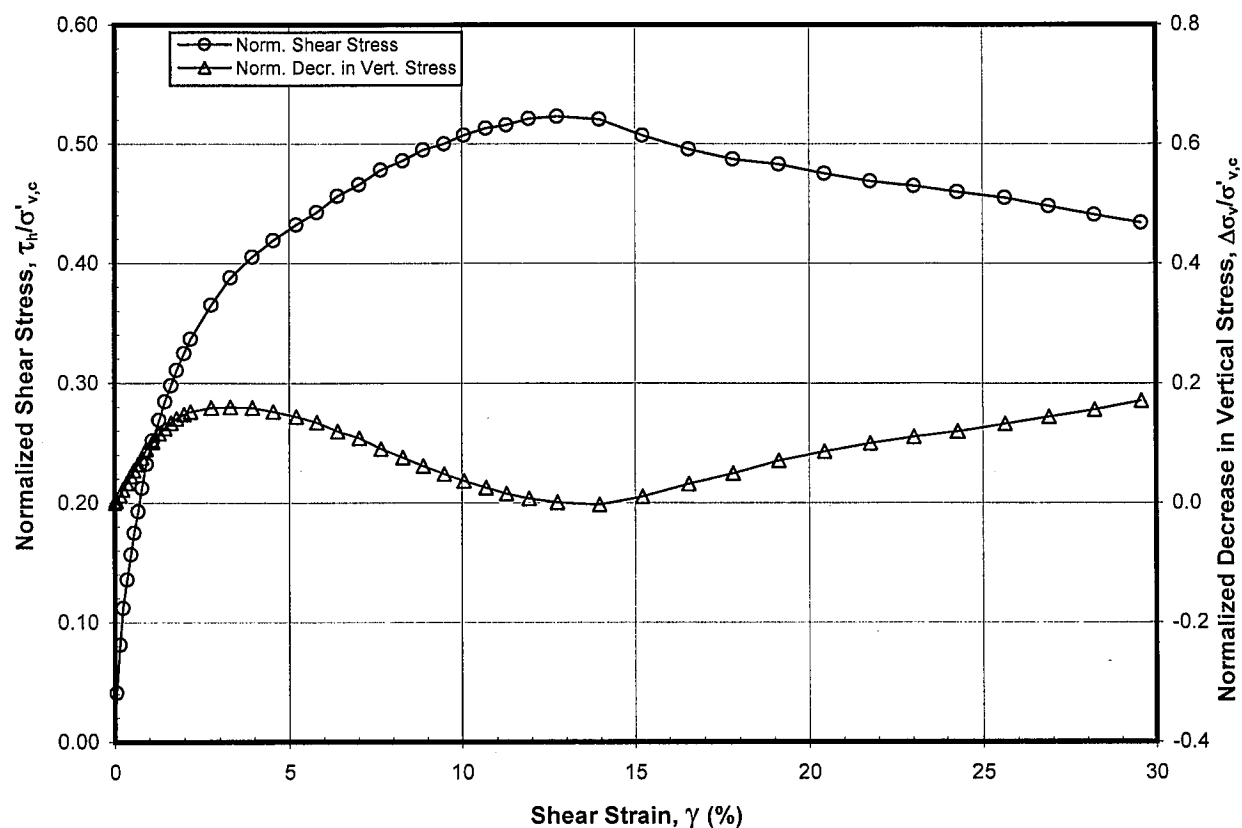
Final Visual Description and Remarks: Pale Brown Fat CLAY (CH)

| Loading Summary      |                         |          |                          |                                      |                                         |                                       |
|----------------------|-------------------------|----------|--------------------------|--------------------------------------|-----------------------------------------|---------------------------------------|
|                      | τ <sub>h</sub><br>(ksf) | γ<br>(%) | σ' <sub>v</sub><br>(ksf) | τ <sub>h</sub> /σ' <sub>v</sub><br>- | Δσ' <sub>v</sub> /σ' <sub>vc</sub><br>- | c <sub>v</sub> /σ' <sub>vc</sub><br>- |
| at Peak Shear Stress | 2.384                   | 8.76     | 5.188                    | 0.459                                | -0.027                                  | 0.472                                 |
| at Maximum Strain    | 2.035                   | 29.17    | 5.324                    | 0.382                                | -0.053                                  | -                                     |

Boring No.: B-2359UD

Sample No.: UD-5B

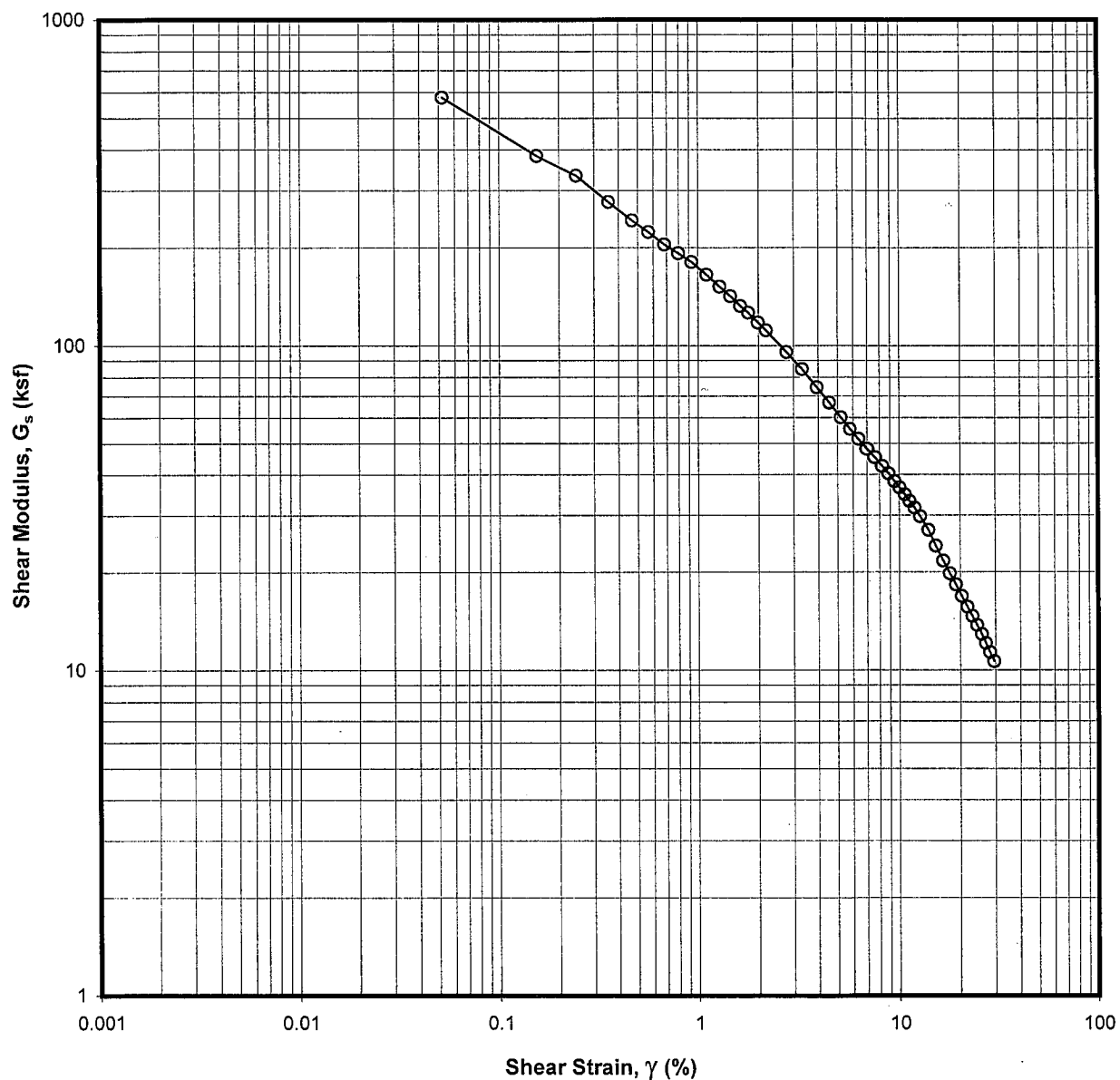
| Elapsed Time<br>(min) | Shear Strain<br>$\gamma$<br>(%) | Shear Stress<br>$\tau_h$<br>(ksf) | Effective Vertical Stress<br>$\sigma'_v$<br>(ksf) | Calculated Pore Press. Change<br>$\Delta U = \Delta \sigma'_v$<br>(ksf) | Secant Shear Modulus<br>$G_s$<br>(ksf) | Tangent Modulus<br>$G_T$<br>(ksf) | Norm. Shear Stress<br>$\tau_h/\sigma'_{v,c}$ | Norm. Vert. Stress<br>$\sigma'_v/\sigma'_{v,c}$ | Norm. Decr. in V. Stress<br>$\Delta \sigma'_v/\sigma'_{v,c}$ | Stress Ratio<br>Angle<br>$\phi'_{DSS}$<br>(°) |
|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------|-----------------------------------|----------------------------------------------|-------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------|
| 0.0                   | 0.00                            | -0.006                            | 5.054                                             | 0.000                                                                   | -                                      | -                                 | -0.001                                       | 1.000                                           | 0.000                                                        | -0.07                                         |
| 2.5                   | 0.01                            | 0.042                             | 5.062                                             | -0.008                                                                  | 431.703                                | 559.329                           | 0.008                                        | 1.002                                           | -0.002                                                       | 0.48                                          |
| 5.0                   | 0.04                            | 0.231                             | 5.115                                             | -0.060                                                                  | 613.036                                | 472.363                           | 0.046                                        | 1.012                                           | -0.012                                                       | 2.59                                          |
| 7.5                   | 0.13                            | 0.459                             | 5.123                                             | -0.068                                                                  | 366.158                                | 243.215                           | 0.091                                        | 1.014                                           | -0.014                                                       | 5.12                                          |
| 10.0                  | 0.21                            | 0.643                             | 5.122                                             | -0.067                                                                  | 312.778                                | 185.250                           | 0.127                                        | 1.013                                           | -0.013                                                       | 7.16                                          |
| 12.5                  | 0.31                            | 0.784                             | 5.088                                             | -0.034                                                                  | 257.524                                | 130.513                           | 0.155                                        | 1.007                                           | -0.007                                                       | 8.76                                          |
| 15.0                  | 0.41                            | 0.905                             | 5.045                                             | 0.009                                                                   | 222.996                                | 119.925                           | 0.179                                        | 0.998                                           | 0.002                                                        | 10.17                                         |
| 17.5                  | 0.52                            | 1.036                             | 4.989                                             | 0.065                                                                   | 201.556                                | 116.927                           | 0.205                                        | 0.987                                           | 0.013                                                        | 11.73                                         |
| 20.0                  | 0.63                            | 1.169                             | 4.921                                             | 0.134                                                                   | 185.259                                | 106.682                           | 0.231                                        | 0.974                                           | 0.026                                                        | 13.36                                         |
| 22.5                  | 0.76                            | 1.292                             | 4.848                                             | 0.206                                                                   | 171.409                                | 94.005                            | 0.256                                        | 0.959                                           | 0.041                                                        | 14.92                                         |
| 25.0                  | 0.89                            | 1.412                             | 4.768                                             | 0.287                                                                   | 158.664                                | 81.482                            | 0.279                                        | 0.943                                           | 0.057                                                        | 16.49                                         |
| 27.5                  | 1.04                            | 1.518                             | 4.684                                             | 0.370                                                                   | 147.232                                | 64.873                            | 0.300                                        | 0.927                                           | 0.073                                                        | 17.96                                         |
| 30.0                  | 1.20                            | 1.608                             | 4.597                                             | 0.457                                                                   | 134.550                                | 48.797                            | 0.318                                        | 0.910                                           | 0.090                                                        | 19.28                                         |
| 32.5                  | 1.37                            | 1.681                             | 4.508                                             | 0.546                                                                   | 123.111                                | 38.506                            | 0.333                                        | 0.892                                           | 0.108                                                        | 20.45                                         |
| 35.0                  | 1.56                            | 1.745                             | 4.434                                             | 0.620                                                                   | 112.368                                | 28.442                            | 0.345                                        | 0.877                                           | 0.123                                                        | 21.49                                         |
| 37.5                  | 1.75                            | 1.788                             | 4.388                                             | 0.666                                                                   | 102.806                                | 21.723                            | 0.354                                        | 0.868                                           | 0.132                                                        | 22.17                                         |
| 40.0                  | 1.93                            | 1.826                             | 4.369                                             | 0.685                                                                   | 95.012                                 | 19.952                            | 0.361                                        | 0.864                                           | 0.136                                                        | 22.68                                         |
| 42.5                  | 2.10                            | 1.860                             | 4.357                                             | 0.697                                                                   | 88.686                                 | 17.163                            | 0.368                                        | 0.862                                           | 0.138                                                        | 23.11                                         |
| 50.0                  | 2.71                            | 1.950                             | 4.329                                             | 0.725                                                                   | 72.293                                 | 13.981                            | 0.386                                        | 0.856                                           | 0.144                                                        | 24.25                                         |
| 57.5                  | 3.31                            | 2.028                             | 4.381                                             | 0.673                                                                   | 61.531                                 | 12.522                            | 0.401                                        | 0.867                                           | 0.133                                                        | 24.83                                         |
| 65.0                  | 3.90                            | 2.100                             | 4.450                                             | 0.605                                                                   | 53.991                                 | 10.905                            | 0.415                                        | 0.880                                           | 0.120                                                        | 25.26                                         |
| 72.5                  | 4.50                            | 2.158                             | 4.525                                             | 0.530                                                                   | 48.055                                 | 9.811                             | 0.427                                        | 0.895                                           | 0.105                                                        | 25.50                                         |
| 80.0                  | 5.10                            | 2.217                             | 4.642                                             | 0.412                                                                   | 43.600                                 | 9.038                             | 0.439                                        | 0.918                                           | 0.082                                                        | 25.53                                         |
| 87.5                  | 5.69                            | 2.265                             | 4.729                                             | 0.325                                                                   | 39.927                                 | 8.960                             | 0.448                                        | 0.936                                           | 0.064                                                        | 25.59                                         |
| 95.0                  | 6.28                            | 2.323                             | 4.844                                             | 0.211                                                                   | 37.097                                 | 7.469                             | 0.460                                        | 0.958                                           | 0.042                                                        | 25.62                                         |
| 102.5                 | 6.92                            | 2.356                             | 4.957                                             | 0.097                                                                   | 34.127                                 | 3.769                             | 0.466                                        | 0.981                                           | 0.019                                                        | 25.42                                         |
| 110.0                 | 7.53                            | 2.370                             | 5.030                                             | 0.024                                                                   | 31.568                                 | 2.193                             | 0.469                                        | 0.995                                           | 0.005                                                        | 25.23                                         |
| 117.5                 | 8.16                            | 2.383                             | 5.126                                             | -0.071                                                                  | 29.269                                 | 1.053                             | 0.472                                        | 1.014                                           | -0.014                                                       | 24.94                                         |
| 125.0                 | 8.76                            | 2.384                             | 5.188                                             | -0.134                                                                  | 27.272                                 | 0.001                             | 0.472                                        | 1.027                                           | -0.027                                                       | 24.68                                         |
| 132.5                 | 9.39                            | 2.383                             | 5.255                                             | -0.201                                                                  | 25.441                                 | -0.946                            | 0.472                                        | 1.040                                           | -0.040                                                       | 24.40                                         |
| 140.0                 | 10.00                           | 2.372                             | 5.323                                             | -0.269                                                                  | 23.793                                 | -2.241                            | 0.469                                        | 1.053                                           | -0.053                                                       | 24.02                                         |
| 147.5                 | 10.60                           | 2.356                             | 5.379                                             | -0.325                                                                  | 22.282                                 | -2.624                            | 0.466                                        | 1.064                                           | -0.064                                                       | 23.66                                         |
| 155.0                 | 11.26                           | 2.339                             | 5.426                                             | -0.371                                                                  | 20.836                                 | -2.429                            | 0.463                                        | 1.073                                           | -0.073                                                       | 23.32                                         |
| 162.5                 | 11.89                           | 2.325                             | 5.452                                             | -0.398                                                                  | 19.597                                 | -2.525                            | 0.460                                        | 1.079                                           | -0.079                                                       | 23.09                                         |
| 172.4                 | 12.75                           | 2.301                             | 5.486                                             | -0.432                                                                  | 18.094                                 | -2.914                            | 0.455                                        | 1.085                                           | -0.085                                                       | 22.75                                         |
| 187.4                 | 14.02                           | 2.262                             | 5.533                                             | -0.478                                                                  | 16.173                                 | -4.085                            | 0.448                                        | 1.095                                           | -0.095                                                       | 22.24                                         |
| 202.4                 | 15.33                           | 2.195                             | 5.542                                             | -0.488                                                                  | 14.362                                 | -5.137                            | 0.434                                        | 1.097                                           | -0.097                                                       | 21.61                                         |
| 217.4                 | 16.60                           | 2.130                             | 5.541                                             | -0.487                                                                  | 12.866                                 | -4.879                            | 0.421                                        | 1.096                                           | -0.096                                                       | 21.02                                         |
| 232.4                 | 17.86                           | 2.072                             | 5.538                                             | -0.484                                                                  | 11.631                                 | -4.097                            | 0.410                                        | 1.096                                           | -0.096                                                       | 20.51                                         |
| 247.4                 | 19.13                           | 2.026                             | 5.532                                             | -0.478                                                                  | 10.620                                 | -3.649                            | 0.401                                        | 1.094                                           | -0.094                                                       | 20.12                                         |
| 262.4                 | 20.38                           | 1.980                             | 5.504                                             | -0.449                                                                  | 9.744                                  | -3.471                            | 0.392                                        | 1.089                                           | -0.089                                                       | 19.79                                         |
| 277.4                 | 21.64                           | 1.939                             | 5.472                                             | -0.418                                                                  | 8.989                                  | -1.244                            | 0.384                                        | 1.083                                           | -0.083                                                       | 19.51                                         |
| 292.3                 | 22.94                           | 1.949                             | 5.465                                             | -0.411                                                                  | 8.523                                  | 2.034                             | 0.386                                        | 1.081                                           | -0.081                                                       | 19.63                                         |
| 307.3                 | 24.16                           | 1.989                             | 5.427                                             | -0.373                                                                  | 8.260                                  | 3.095                             | 0.394                                        | 1.074                                           | -0.074                                                       | 20.13                                         |
| 322.3                 | 25.41                           | 2.025                             | 5.413                                             | -0.359                                                                  | 7.994                                  | 1.843                             | 0.401                                        | 1.071                                           | -0.071                                                       | 20.51                                         |
| 337.3                 | 26.71                           | 2.036                             | 5.373                                             | -0.319                                                                  | 7.644                                  | 0.134                             | 0.403                                        | 1.063                                           | -0.063                                                       | 20.75                                         |
| 352.3                 | 27.96                           | 2.029                             | 5.350                                             | -0.296                                                                  | 7.280                                  | -0.037                            | 0.401                                        | 1.059                                           | -0.059                                                       | 20.77                                         |
| 367.3                 | 29.17                           | 2.035                             | 5.324                                             | -0.269                                                                  | 6.996                                  | 0.468                             | 0.403                                        | 1.053                                           | -0.053                                                       | 20.92                                         |



**STATIC DSS TEST**  
 $K_o$  Consolidation - OCR = NA  
 Sample: UD-10B - Depth: 70.0 - 71.5 ft  
 Boring B-2359UD

KAW 7/16/08





**STATIC DSS TEST**  
 $K_o$  Consolidation - OCR = NA  
 Sample: UD-10B - Depth: 70.0 - 71.5 ft  
 Boring B-2359UD

KAW 7/16/08

# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686      Test Type: SDSS      Sta. No.: 6G      File Name: B-2359\_UD10b  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 7.20 ksf       $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$  = NA  
 Project Name: Exelon (Victoria)      Induced OCR = NA       $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$  = NA  
 Test No.: NA      Test Series for/on: NA      Type Stage: NA      = NA, NA, NA & NA  
 Assig. Remarks:      Specific Gravity: 2.720      ☒ Meas.;      ☐ Assumed

|                                                    |                                         |                                           |                                   |                                        |                                                          |                         |
|----------------------------------------------------|-----------------------------------------|-------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded | <input type="checkbox"/> Liner            | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping       | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                               |                                         | <input type="checkbox"/> LPC Core         |                                   | <input type="checkbox"/> Impact/Rammer | Rammer Wgt. (lb) =                                       | No. Layers =            |
| Sample No.: UD-10                                  |                                         | Compostite No.:                           |                                   | <input type="checkbox"/> Pluviated:    | Tamper Force (lb) =                                      | Drop (in.) =            |
| Depth (ft): 70.0 - 71.5                            |                                         | Specimen No.: B                           |                                   | <input type="checkbox"/> Kneading      | <input type="checkbox"/> Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; |                                         | <input type="checkbox"/> Geomarine Sample |                                   |                                        | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

|                     |                                               |                                                 |                                |                                                    |                                                            |                                                |
|---------------------|-----------------------------------------------|-------------------------------------------------|--------------------------------|----------------------------------------------------|------------------------------------------------------------|------------------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> $K_o$ at: | <input checked="" type="checkbox"/> Incremental | ;                              | <input type="checkbox"/> Anisotropic at:           | <input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$ | <input type="checkbox"/> Used Automated System |
|                     |                                               | CRS                                             |                                |                                                    | 90° Stress Path                                            | Remarks:                                       |
| Loading Conditions: | <input checked="" type="checkbox"/> Static    | <input checked="" type="checkbox"/> Strain      | <input type="checkbox"/> Creep | <input checked="" type="checkbox"/> Const. Vol./Ht | <input checked="" type="checkbox"/> Without - Water        | <input type="checkbox"/> Cyclic (Hz)           |
|                     | Rapid                                         | Stress                                          | Post Cyclic                    | Drained                                            | With - Bath                                                | Rate: 0.1; 1; Other:                           |

| Water Content (WC);                                      |  | Initial - Trimming Location |                                   |                           | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                    |        | Initial | Final |
|----------------------------------------------------------|--|-----------------------------|-----------------------------------|---------------------------|---------------------------------------|---------------------------------------------------------|--------|---------|-------|
|                                                          |  | Top (W <sub>o,1</sub> )     | Bottom (W <sub>o,2</sub> )        | Sides (W <sub>o,3</sub> ) |                                       | Mass Moist Soil + Tare (g)                              | 318.52 | 139.40  |       |
| Container No.                                            |  | 1152                        |                                   | 4247                      | 4096                                  | Mass Tare (g)                                           | 183.38 | 4.17    |       |
| Mass Moist Soil + Cont. (g)                              |  | 123.58                      |                                   | 67.42                     | 72.36                                 | Mass Moist Soil, M <sub>t,o</sub> M <sub>t,at</sub> (g) | 135.14 | 135.23  |       |
| Mass Dry Soil + Container (g)                            |  | 109.92                      |                                   | 61.97                     | 65.78                                 | Excess Dry Soil (soil not included in final mass above) |        |         |       |
| Mass Container (g)                                       |  | 32.38                       |                                   | 30.13                     | 30.61                                 | Container No.                                           |        |         |       |
| WATER CONTENT (%)                                        |  | 17.62                       |                                   | 17.12                     | 18.71                                 | Mass Dry Soil + Container (g)                           |        |         |       |
| Avg. Initial WC, W <sub>o,avg</sub> (%)                  |  | 17.37                       | Final W <sub>at</sub> : X Slice ; |                           | Whole Spec.                           | Mass Container (g)                                      |        |         |       |
| See attached data sheet(s) for additional water contents |  |                             |                                   |                           | Mass Excess Dry Soil (g)              |                                                         | 0.00   |         |       |

| Specimen Trimming:                                                                   |                    |                                           |       |
|--------------------------------------------------------------------------------------|--------------------|-------------------------------------------|-------|
| <input type="checkbox"/> Trimming Ring for Fugro Apparatus                           | NL6                | Large-ring ID #                           |       |
| <input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus                  |                    | Small-ring ID #                           |       |
| $H_{s,t}$ (mm):                                                                      | 18.55              | $A_{s,t}$ (cm <sup>2</sup> ):             | 34.68 |
| $D_{s,t}$ (mm):                                                                      | 66.45              | $V_{s,t}$ (cm <sup>3</sup> ):             | 64.32 |
| Remarks:                                                                             |                    |                                           |       |
| <input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm) |                    |                                           |       |
| Height ( $H_{tr}$ )                                                                  | Diameter ( $D_o$ ) | Remarks:                                  |       |
| 1 18.630                                                                             | 1-T NA             | For Free Standing or Reconstituted Spec.: |       |
| 2 18.480                                                                             | 2-M NA             |                                           |       |
| 3 18.550                                                                             | 3-B NA             |                                           |       |
| 4 18.550                                                                             | 1'-T NA            |                                           |       |
| 5 18.550                                                                             | 2'-M NA            |                                           |       |
| Avg.                                                                                 | 3'-B NA            | $A_{tr}$ (cm <sup>2</sup> ):              | NA    |
| = 18.550                                                                             | Avg NA             | $V_{tr}$ (cm <sup>3</sup> ):              | NA    |

| Estimated Initial Unit Weight                 |        |
|-----------------------------------------------|--------|
| Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) = | 131.16 |
| Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =   | 111.75 |

| Specimen Lateral Confinement by:                                         |                                          |                             |                                    |                                                                      |
|--------------------------------------------------------------------------|------------------------------------------|-----------------------------|------------------------------------|----------------------------------------------------------------------|
| Wire Reinforced, Model:                                                  |                                          | Thickness (mm) =            |                                    |                                                                      |
| Stress Level                                                             | Dia. by PiTape (mm) Meas.                | Corr.                       | Area, $A_{c,n}$ (cm <sup>2</sup> ) | (in <sup>2</sup> )                                                   |
| 0                                                                        |                                          |                             |                                    |                                                                      |
| $\sigma'_{v,c}$                                                          |                                          |                             |                                    |                                                                      |
| $\sigma'_{v,max}$                                                        |                                          |                             |                                    |                                                                      |
| <input checked="" type="checkbox"/> Regular Membrane with Ring Set No. 6 | ID, Rings (mm)                           |                             |                                    |                                                                      |
| Thickness (mm):                                                          | Top: 0.62                                |                             | =                                  | 67.08                                                                |
| <input type="checkbox"/> Single                                          | Bottom: 0.63                             |                             | Corr. for mem.                     |                                                                      |
| <input checked="" type="checkbox"/> Double                               | Membr. Thick. = 0.31                     |                             | =                                  | 66.450                                                               |
| Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =                          |                                          | 34.68                       | ;                                  | (in <sup>2</sup> ) = 5.375                                           |
| Mass Top Cap, etc., $M_{tc}$ =                                           |                                          | 526.0 g,                    | 1.16 lbf                           |                                                                      |
| Data corr. for $M_{tc}$ :                                                | <input checked="" type="checkbox"/> Yes; | <input type="checkbox"/> No | Plattens with Pins:                | <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No |

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Mottled Light Gray and Yellowish Brown Fat CLAY (CH)

Other Remarks :

|                      |                    |                           |
|----------------------|--------------------|---------------------------|
| Trim./ Recon. By: HC | Setup By: HC       | Take Down By: HC          |
| Date: 3/24/2008      | Date: 3/25/2008    | Date: 3/27/2008           |
| Prelim. Calc. By: HC | Final Calc. By: LF | Reviewed By: HP <b>HP</b> |

Specimen Take Down: ☒ Spec. removed right after shearing  
☐ Spec. unloaded to zero stress with access to water

Remarks:

**KAW 7/16/08**

# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686  
Task Number: NA

Test Station No.: 6G  
Specific Gravity: 2.720

File Name: B-2359\_UD10b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = \_\_\_\_\_ ppm

## Consolidation Stress Summary and Loading Summary

| Test Stage:                                                                                                                                               | Max. Stress | Pre-Shear        | Post Cyclic | <input checked="" type="checkbox"/> Static Strain Rate = <u>NA</u> (%/hr or )                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|-------------|---------------------------------------------------------------------------------------------------|
| Nominal Vertical Stress, $\sigma'_v$ (ksf)                                                                                                                | <u>NA</u>   | <u>7.2</u>       | <u>NA</u>   | Cyclic Rate (Hz): <u>0.1</u> ; <u>1</u> ; Other =                                                 |
| Axial/Vertical Force, $P_{v,n}$ (lbf)                                                                                                                     | <u>NA</u>   | <u>NA</u>        | <u>NA</u>   | During/End of Loading                                                                             |
| Horizontal Force, $P_{h,n}$ (lbf)                                                                                                                         | <u>NA</u>   | <u>0</u>         | <u>NA</u>   | Change in Height, $\Delta H_{L,n}$ (mm)                                                           |
| Nominal OCR                                                                                                                                               | <u>NA</u>   | <u>NA</u>        | <u>NA</u>   | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> )                                               |
| $t_c$ (ON, days, hrs)                                                                                                                                     | <u>NA</u>   | <u>0.83 days</u> | <u>NA</u>   | Post Cy. Displ. Reset to Null Position: <input type="checkbox"/> Yes; <input type="checkbox"/> No |
| Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u> |             |                  |             |                                                                                                   |

## Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

|                                                                          | Top, $W_{o,1}$ | Bottom, $W_{o,2}$ | Sides, $W_{o,3}$ | Avg., $W_{o,avg}$ | Selct., $W_{o,s}$ | Back Cal.     |
|--------------------------------------------------------------------------|----------------|-------------------|------------------|-------------------|-------------------|---------------|
| $W_o$                                                                    | <u>17.62</u>   |                   | <u>17.12</u>     | <u>17.37</u>      | <u>17.37</u>      | <u>18.63</u>  |
| $S_o$                                                                    | <u>92.2</u>    |                   | <u>90.7</u>      | <u>91.4</u>       | <u>91.4</u>       | <u>95.1</u>   |
| Measured final mass of moist soil, $M_{t,at}$ (g)                        |                |                   |                  |                   |                   | <u>135.23</u> |
| Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g) |                |                   |                  |                   |                   | <u>135.23</u> |

## Calculated Mass of Dry Soil (g)

|                                    |               |
|------------------------------------|---------------|
| Initial Selected Water Content (%) | <u>17.37</u>  |
| Initial, $M_{d,o}$                 | <u>115.14</u> |
| Final, $M_{d,at}$                  | <u>113.92</u> |
| Selected, $M_d$                    | <u>114.53</u> |

## Initial Back Cal. Specific Gravity (TS):

|                              |  |
|------------------------------|--|
| Selected $S_o$ (%)           |  |
| Selected $W_o$ (%)           |  |
| Specific Gravity, $G_{s,bc}$ |  |

## Height/Volume Change Summary

| Variation in Height & Volume During Consol.                                              | During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$ | During Rebound to $\sigma'_{v,c}$ | Specimen Unloaded After Test To |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------|---------------------------------|
| Stress Units (ksf)                                                                       | <u>7.200</u>                                                     | <u>NA</u>                         | <u>NA</u>                       |
| Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up |                                                                  |                                   |                                 |
| Delta Def. Read., $\Delta d_{ar,n}$ (mm)                                                 | <u>0.590</u>                                                     |                                   |                                 |
| Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)                                        | <u>0.000</u>                                                     |                                   |                                 |
| Corr. Total Def. $\Delta H_{c,n}$ (mm)                                                   | <u>0.590</u>                                                     |                                   |                                 |
| $\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )                                      | <u>2.05</u>                                                      |                                   |                                 |
| $\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )                                   | <u>2.05</u>                                                      |                                   |                                 |
| $\Delta V_n$ using burette meas. (cm <sup>3</sup> )                                      | <u>-0.50</u>                                                     |                                   |                                 |
| Selected $\Delta V_n$ (cm <sup>3</sup> )                                                 | <u>2.05</u>                                                      | <u>NA</u>                         | <u>NA</u> = $\Delta V_{UL}$     |
| After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)              |                                                                  |                                   | <u>NA</u>                       |

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

## Calculation of $\Delta V_c$ by Different Procedures

| By Selected Volumes             | By Change in Mass                                          |
|---------------------------------|------------------------------------------------------------|
| $\Delta V_c$ (cm <sup>3</sup> ) | $\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$ |
| <u>2.05</u>                     | <u>-0.09</u>                                               |
| By Cal. Height & App. Area      | By Saturation = 100% and Spec. Unloaded to 0 Stress        |
| $\Delta V_c$ (cm <sup>3</sup> ) | $\Delta V_c$ (cm <sup>3</sup> )                            |
| <u>2.05</u>                     | <u>NA</u>                                                  |

## Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

|                                                 |               |
|-------------------------------------------------|---------------|
| Assumed Saturation (%)                          | <u>100.00</u> |
| Back Cal. WC before Loading, $W_{c,bc}$ (%)     | <u>17.52</u>  |
| Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%) | <u>NA</u>     |

|                                     |                                               |                                    |                                    |                                                   |
|-------------------------------------|-----------------------------------------------|------------------------------------|------------------------------------|---------------------------------------------------|
| <b>Consolidation &amp; Preshear</b> | $\Delta V_c$ (cm <sup>3</sup> ) = <u>2.04</u> | $\Delta H_c$ (mm) = <u>0.590</u>   | $\epsilon_{a,c}$ (%) = <u>3.18</u> | $\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u> |
|                                     | $V_c$ (cm <sup>3</sup> ) = <u>62.29</u>       | $H_c$ (mm) = <u>17.960</u>         | $\epsilon_{v,c}$ (%) = <u>3.17</u> | $\epsilon_{ac,max}$ (%) = <u>NA</u>               |
|                                     | $A_c$ (cm <sup>2</sup> ) = <u>34.68</u>       | $\Delta \gamma_c$ (mm) = <u>NA</u> | $\gamma_c$ (%) = <u>NA</u>         | Preshear: $\gamma_{ua}$ (%) = <u>NA</u>           |

## Summary of Specimen Physical Properties:

| Specific Gravity: $G_s = 2.720$ Measured | Height (mm)   | Volume (cm <sup>3</sup> ) | Area (cm <sup>2</sup> ) | Water Content (%) | Total Unit Weight (pcf) | Dry Unit Weight (pcf) | Saturation (%) | Void Ratio, e |
|------------------------------------------|---------------|---------------------------|-------------------------|-------------------|-------------------------|-----------------------|----------------|---------------|
| Condition:                               |               |                           |                         |                   |                         |                       |                |               |
| Initial (as trimmed)                     | <u>18.550</u> | <u>64.32</u>              | <u>34.68</u>            | <u>18.0</u>       | <u>131.2</u>            | <u>111.2</u>          | <u>93.2</u>    | <u>0.528</u>  |
| After to $\sigma'_{v,c}$                 | <u>17.960</u> | <u>62.29</u>              | <u>34.68</u>            | <u>17.5</u>       | <u>134.9</u>            | <u>114.8</u>          | <u>100.0</u>   | <u>0.479</u>  |
| Consol.: to $\sigma'_{v,c,max}$          | <u>NA</u>     | <u>NA</u>                 | <u>NA</u>               | <u>NA</u>         | <u>NA</u>               | <u>NA</u>             | <u>NA</u>      | <u>NA</u>     |

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.  
& Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable  
3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF  
Reviewed By: HP

Remarks: t95 for max stress = 7.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 6G File Name: B-2359\_UD10b  
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

|                                                    |                                           |                                |                                   |                                  |                                           |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lbf) =                       | No. Layers =            |
| Sample No.: UD-10                                  | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lbf) =                      | Drop (in.) =            |
| Depth (ft): 70.0 - 71.5                            | Specimen No.: B                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: | U <sub>ni</sub> (%) =   |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                             | % Comp. = ± Opt. =      |

|                     |                                                        |                                                     |                                            |                                                                   |                                                          |                                                           |
|---------------------|--------------------------------------------------------|-----------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> K <sub>o</sub> at: | <input checked="" type="checkbox"/> Incremental CRS | <input type="checkbox"/> Anisotropic at:   | <input type="checkbox"/> Inclined Stress Path, K <sub>c,DSS</sub> | <input type="checkbox"/> Used Automated System           | Remarks:                                                  |
| Loading Conditions: | <input checked="" type="checkbox"/> Static             | <input checked="" type="checkbox"/> Strain Stress   | <input type="checkbox"/> Creep Post Cyclic | <input checked="" type="checkbox"/> Const. Vol./Ht Drained        | <input checked="" type="checkbox"/> Without - Water Bath | <input type="checkbox"/> Cyclic (Hz) Rate: 0.1; 1; Other: |

| Summary of Specimen Physical Properties              |                |                              |                            |                      |                      |       |                   |          |           |                  |
|------------------------------------------------------|----------------|------------------------------|----------------------------|----------------------|----------------------|-------|-------------------|----------|-----------|------------------|
| Specific Gravity:<br>G <sub>s</sub> = 2.720 Measured | Height<br>(mm) | Volume<br>(cm <sup>3</sup> ) | Area<br>(cm <sup>2</sup> ) | Water Content<br>(%) | Unit Weight<br>(pcf) |       | Saturation<br>(%) | LL<br>PL | -200<br>% | Void Ratio,<br>e |
| Condition:                                           |                |                              |                            |                      | Total                | Dry   |                   | PI       |           |                  |
| Initial                                              | 18.55          | 64.32                        | 34.68                      | 18.00                | 131.2                | 111.2 | 93.2              | 95       | 96.0      | 0.528            |
| After to σ' <sub>v,c</sub>                           | 17.96          | 62.29                        | 34.68                      | 17.52                | 134.9                | 114.8 | 100.0             | 34       | NA        | 0.479            |
| Consol.: to σ' <sub>vc,max</sub>                     | NA             | NA                           | NA                         | NA                   | NA                   | NA    | NA                | 61       | NA        | NA               |

| Consolidation Stress Summary and Loading Summary   |       |             |           |             |   |                                                        |                     |        |         |  |
|----------------------------------------------------|-------|-------------|-----------|-------------|---|--------------------------------------------------------|---------------------|--------|---------|--|
| Item                                               | Unit  | Max. Stress | Pre-Shear | Post Cyclic | X | Static Strain Rate = 4.7 %/hr.                         |                     |        |         |  |
| Vert. Consol. Stress, $\sigma'_{v,c}$              | (ksf) | NA          | 7.222     | NA          |   | Cyclic Rate (Hz):                                      | 0.1;                | 1;     | Other = |  |
| Induced OCR:                                       | -     | NA          | NA        | NA          |   | During/End of Loading                                  |                     | Static | Cyclic  |  |
| Axial Strain during Consol., $\epsilon_{a,c}$      | %     | NA          | 3.18      | NA          |   | Change in Height, $\Delta H_{L,n}$ (mm):               |                     | NA     | NA      |  |
| Horiz. Consol. Stress, $\tau_{h,c}$                | (ksf) | NA          | NA        | NA          |   | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ):   |                     | NA     | NA      |  |
| Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$ | -     | NA          | NA        | NA          |   | Post Cy.Displ. Reset to Null Pos.:                     | Yes;                |        | No      |  |
| Shear Strain during Consol., $\epsilon_{h,c}$      | %     | NA          | NA        | NA          |   | Number of Loading Cycles, N = NA                       |                     |        |         |  |
| Undr. Ambient Shear Stress, $\tau_{h,ua}$          | (ksf) | NA          | NA        | NA          |   | $\pm \tau_h =$ NA (ksf)                                | $\pm \gamma =$ NA % |        |         |  |
| Undr. Ambient Shear Strain, $\epsilon_{ua}$        | %     | NA          | NA        | NA          |   | at end of cyclic loading, $\sigma'_{vcy,r} =$ NA (ksf) |                     |        |         |  |

|                                                                                                       |                                                                                                            |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Weight Top Cap, etc., M <sub>tc</sub> (lbf): 1.16                                                     | Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: 7.222 (ksf) |
| Data corr. for M <sub>tc</sub> : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No | Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No                   |
| Wire Reinforced Membrane, Model: _____                                                                | Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No        |
| <input checked="" type="checkbox"/> Regular Membrane with Rings                                       | <input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions   |
|                                                                                                       | <input type="checkbox"/> Maximum Stress during Consol.                                                     |

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

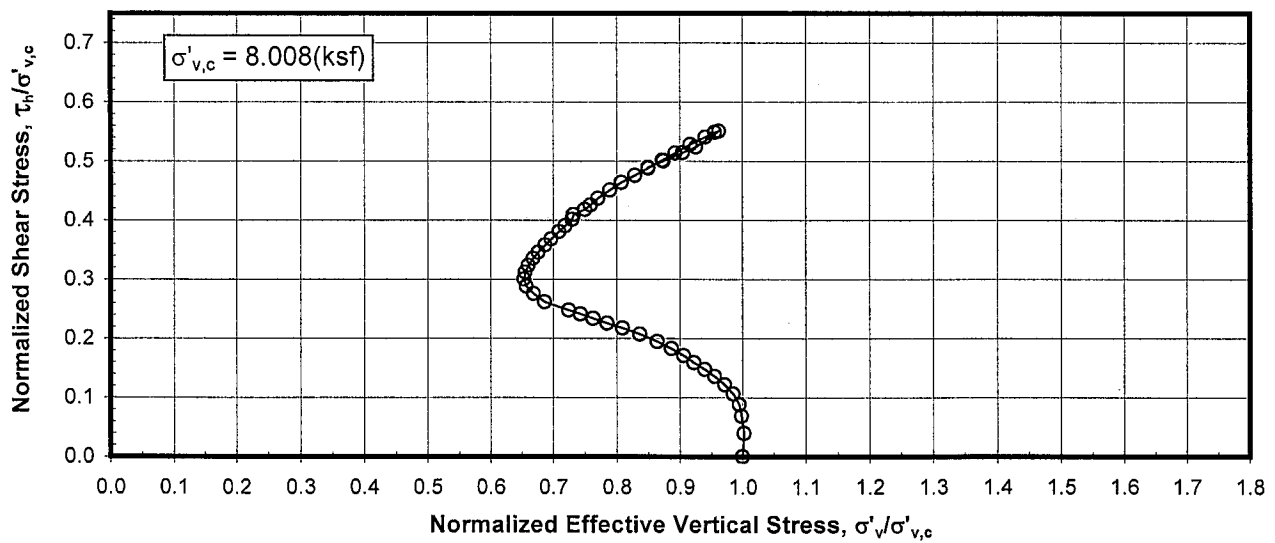
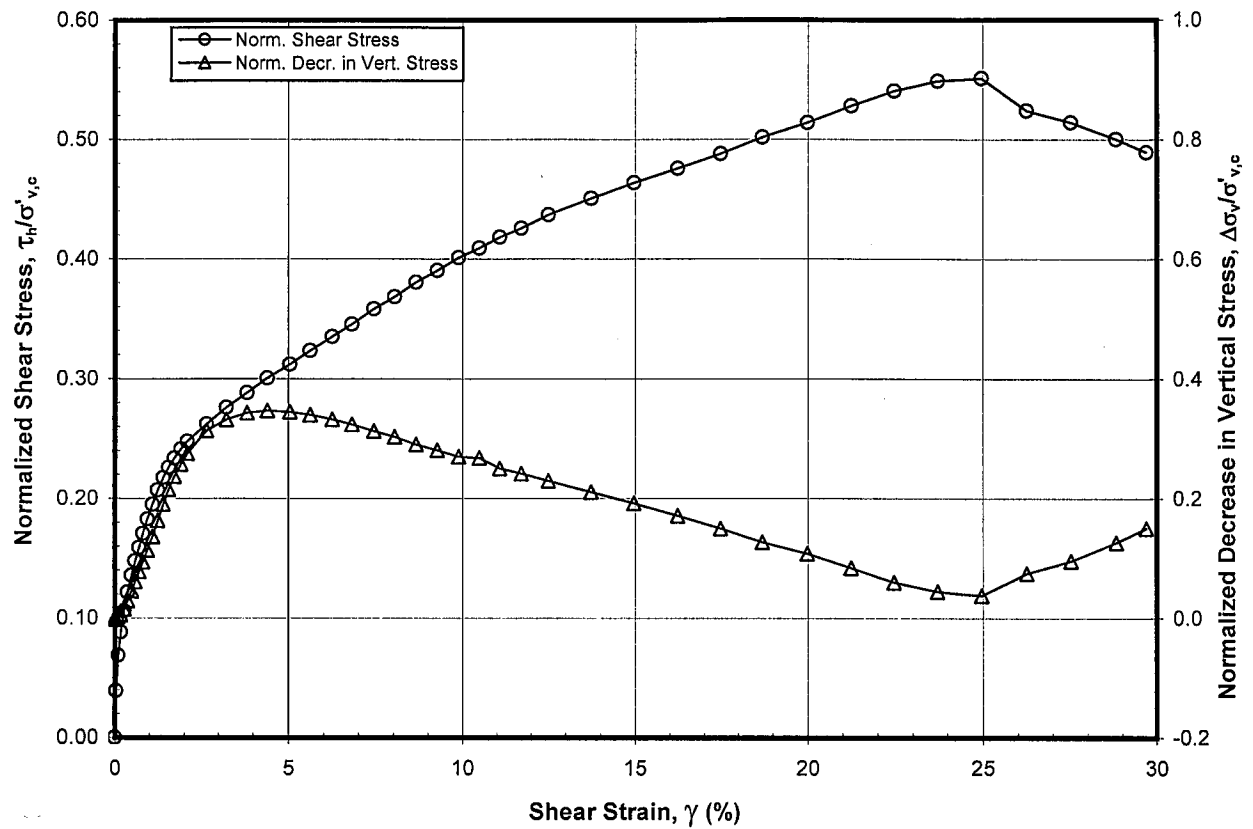
Final Visual Description and Remarks: Mottled Light Gray and Yellowish Brown Fat CLAY (CH)

| Loading Summary      |                         |          |                          |                                      |                                         |                                       |
|----------------------|-------------------------|----------|--------------------------|--------------------------------------|-----------------------------------------|---------------------------------------|
|                      | τ <sub>h</sub><br>(ksf) | γ<br>(%) | σ' <sub>v</sub><br>(ksf) | τ <sub>h</sub> /σ' <sub>v</sub><br>- | Δσ' <sub>v</sub> /σ' <sub>vc</sub><br>- | c <sub>v</sub> /σ' <sub>vc</sub><br>- |
| at Peak Shear Stress | 3.777                   | 12.74    | 7.218                    | 0.523                                | 0.001                                   | 0.523                                 |
| at Maximum Strain    | 3.135                   | 29.58    | 5.988                    | 0.524                                | 0.171                                   | -                                     |

Boring No.: B-2359UD

Sample No.: UD-10B

| Elapsed Time<br>(min) | Shear Strain<br>$\gamma$<br>(%) | Shear Stress<br>$\tau_h$<br>(ksf) | Effective Vertical Stress<br>$\sigma'_v$<br>(ksf) | Calculated Pore Press. Change<br>$\Delta U = \Delta \sigma'_v$<br>(ksf) | Secant Shear Modulus<br>$G_s$<br>(ksf) | Tangent Modulus<br>$G_T$<br>(ksf) | Norm. Shear Stress<br>$\tau_h/\sigma'_{v,c}$ | Norm. Vert. Stress<br>$\sigma'_v/\sigma'_{v,c}$ | Norm. Decr. in V. Stress<br>$\Delta \sigma'_v/\sigma'_{v,c}$ | Stress Ratio Angle<br>$\phi'_{DSS}$<br>(°) |
|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------|-----------------------------------|----------------------------------------------|-------------------------------------------------|--------------------------------------------------------------|--------------------------------------------|
| 0.0                   | 0.00                            | -0.005                            | 7.222                                             | 0.000                                                                   | -                                      | -                                 | -0.001                                       | 1.000                                           | 0.000                                                        | -0.04                                      |
| 2.5                   | -0.01                           | -0.007                            | 7.211                                             | 0.011                                                                   | -                                      | -                                 | -0.001                                       | 0.998                                           | 0.002                                                        | -0.05                                      |
| 5.1                   | 0.05                            | 0.297                             | 7.204                                             | 0.019                                                                   | 578.161                                | 395.791                           | 0.041                                        | 0.997                                           | 0.003                                                        | 2.36                                       |
| 7.6                   | 0.15                            | 0.588                             | 7.133                                             | 0.089                                                                   | 382.500                                | 265.254                           | 0.081                                        | 0.988                                           | 0.012                                                        | 4.71                                       |
| 10.2                  | 0.24                            | 0.809                             | 7.066                                             | 0.157                                                                   | 332.920                                | 199.658                           | 0.112                                        | 0.978                                           | 0.022                                                        | 6.54                                       |
| 12.7                  | 0.36                            | 0.980                             | 6.986                                             | 0.236                                                                   | 276.024                                | 143.688                           | 0.136                                        | 0.967                                           | 0.033                                                        | 7.98                                       |
| 15.3                  | 0.47                            | 1.132                             | 6.901                                             | 0.321                                                                   | 242.248                                | 133.528                           | 0.157                                        | 0.956                                           | 0.044                                                        | 9.32                                       |
| 17.8                  | 0.57                            | 1.262                             | 6.831                                             | 0.391                                                                   | 223.053                                | 121.560                           | 0.175                                        | 0.946                                           | 0.054                                                        | 10.47                                      |
| 20.4                  | 0.68                            | 1.392                             | 6.757                                             | 0.465                                                                   | 204.056                                | 116.248                           | 0.193                                        | 0.936                                           | 0.064                                                        | 11.64                                      |
| 22.9                  | 0.80                            | 1.533                             | 6.681                                             | 0.541                                                                   | 192.019                                | 116.031                           | 0.212                                        | 0.925                                           | 0.075                                                        | 12.92                                      |
| 25.5                  | 0.93                            | 1.676                             | 6.578                                             | 0.644                                                                   | 180.763                                | 96.463                            | 0.232                                        | 0.911                                           | 0.089                                                        | 14.30                                      |
| 28.0                  | 1.10                            | 1.819                             | 6.493                                             | 0.729                                                                   | 165.152                                | 75.439                            | 0.252                                        | 0.899                                           | 0.101                                                        | 15.65                                      |
| 30.6                  | 1.28                            | 1.943                             | 6.389                                             | 0.833                                                                   | 151.673                                | 67.348                            | 0.269                                        | 0.885                                           | 0.115                                                        | 16.91                                      |
| 33.1                  | 1.45                            | 2.054                             | 6.326                                             | 0.896                                                                   | 141.703                                | 59.940                            | 0.284                                        | 0.876                                           | 0.124                                                        | 17.98                                      |
| 35.7                  | 1.63                            | 2.151                             | 6.261                                             | 0.961                                                                   | 132.072                                | 57.497                            | 0.298                                        | 0.867                                           | 0.133                                                        | 18.96                                      |
| 38.2                  | 1.78                            | 2.243                             | 6.206                                             | 1.016                                                                   | 126.003                                | 54.139                            | 0.311                                        | 0.859                                           | 0.141                                                        | 19.87                                      |
| 40.8                  | 2.00                            | 2.345                             | 6.158                                             | 1.064                                                                   | 117.611                                | 46.598                            | 0.325                                        | 0.853                                           | 0.147                                                        | 20.85                                      |
| 43.3                  | 2.19                            | 2.432                             | 6.126                                             | 1.096                                                                   | 111.330                                | 40.601                            | 0.337                                        | 0.848                                           | 0.152                                                        | 21.65                                      |
| 51.0                  | 2.77                            | 2.638                             | 6.075                                             | 1.147                                                                   | 95.425                                 | 32.664                            | 0.365                                        | 0.841                                           | 0.159                                                        | 23.47                                      |
| 58.6                  | 3.32                            | 2.802                             | 6.069                                             | 1.153                                                                   | 84.566                                 | 24.978                            | 0.388                                        | 0.840                                           | 0.160                                                        | 24.78                                      |
| 66.3                  | 3.95                            | 2.929                             | 6.076                                             | 1.146                                                                   | 74.290                                 | 18.340                            | 0.406                                        | 0.841                                           | 0.159                                                        | 25.73                                      |
| 73.9                  | 4.55                            | 3.028                             | 6.122                                             | 1.100                                                                   | 66.669                                 | 15.416                            | 0.419                                        | 0.848                                           | 0.152                                                        | 26.32                                      |
| 81.5                  | 5.21                            | 3.122                             | 6.185                                             | 1.037                                                                   | 60.034                                 | 13.627                            | 0.432                                        | 0.856                                           | 0.144                                                        | 26.79                                      |
| 89.2                  | 5.79                            | 3.198                             | 6.254                                             | 0.968                                                                   | 55.273                                 | 14.573                            | 0.443                                        | 0.866                                           | 0.134                                                        | 27.09                                      |
| 96.8                  | 6.40                            | 3.296                             | 6.359                                             | 0.863                                                                   | 51.573                                 | 13.592                            | 0.456                                        | 0.881                                           | 0.119                                                        | 27.40                                      |
| 104.5                 | 7.02                            | 3.365                             | 6.444                                             | 0.778                                                                   | 47.989                                 | 12.585                            | 0.466                                        | 0.892                                           | 0.108                                                        | 27.57                                      |
| 112.1                 | 7.65                            | 3.453                             | 6.571                                             | 0.651                                                                   | 45.211                                 | 11.418                            | 0.478                                        | 0.910                                           | 0.090                                                        | 27.72                                      |
| 119.7                 | 8.29                            | 3.509                             | 6.677                                             | 0.545                                                                   | 42.387                                 | 9.875                             | 0.486                                        | 0.925                                           | 0.075                                                        | 27.72                                      |
| 127.4                 | 8.88                            | 3.574                             | 6.782                                             | 0.440                                                                   | 40.306                                 | 8.534                             | 0.495                                        | 0.939                                           | 0.061                                                        | 27.79                                      |
| 135.0                 | 9.49                            | 3.611                             | 6.878                                             | 0.344                                                                   | 38.094                                 | 7.606                             | 0.500                                        | 0.952                                           | 0.048                                                        | 27.70                                      |
| 142.7                 | 10.06                           | 3.664                             | 6.961                                             | 0.261                                                                   | 36.448                                 | 7.885                             | 0.507                                        | 0.964                                           | 0.036                                                        | 27.76                                      |
| 150.3                 | 10.69                           | 3.705                             | 7.041                                             | 0.181                                                                   | 34.695                                 | 5.064                             | 0.513                                        | 0.975                                           | 0.025                                                        | 27.75                                      |
| 158.0                 | 11.27                           | 3.726                             | 7.115                                             | 0.107                                                                   | 33.089                                 | 4.591                             | 0.516                                        | 0.985                                           | 0.015                                                        | 27.64                                      |
| 165.6                 | 11.93                           | 3.762                             | 7.174                                             | 0.048                                                                   | 31.587                                 | 3.723                             | 0.521                                        | 0.993                                           | 0.007                                                        | 27.68                                      |
| 175.8                 | 12.74                           | 3.777                             | 7.218                                             | 0.004                                                                   | 29.676                                 | 0.179                             | 0.523                                        | 0.999                                           | 0.001                                                        | 27.62                                      |
| 191.1                 | 13.96                           | 3.760                             | 7.248                                             | -0.026                                                                  | 26.962                                 | -4.623                            | 0.521                                        | 1.004                                           | -0.004                                                       | 27.42                                      |
| 206.3                 | 15.23                           | 3.661                             | 7.149                                             | 0.073                                                                   | 24.075                                 | -7.017                            | 0.507                                        | 0.990                                           | 0.010                                                        | 27.12                                      |
| 221.6                 | 16.55                           | 3.578                             | 6.997                                             | 0.225                                                                   | 21.642                                 | -5.462                            | 0.495                                        | 0.969                                           | 0.031                                                        | 27.09                                      |
| 236.9                 | 17.81                           | 3.519                             | 6.868                                             | 0.354                                                                   | 19.781                                 | -3.509                            | 0.487                                        | 0.951                                           | 0.049                                                        | 27.13                                      |
| 252.2                 | 19.13                           | 3.488                             | 6.714                                             | 0.508                                                                   | 18.255                                 | -3.307                            | 0.483                                        | 0.930                                           | 0.070                                                        | 27.45                                      |
| 267.5                 | 20.45                           | 3.432                             | 6.605                                             | 0.617                                                                   | 16.809                                 | -3.846                            | 0.475                                        | 0.915                                           | 0.085                                                        | 27.46                                      |
| 282.7                 | 21.77                           | 3.387                             | 6.502                                             | 0.720                                                                   | 15.577                                 | -2.862                            | 0.469                                        | 0.900                                           | 0.100                                                        | 27.52                                      |
| 298.0                 | 23.03                           | 3.358                             | 6.427                                             | 0.795                                                                   | 14.601                                 | -2.601                            | 0.465                                        | 0.890                                           | 0.110                                                        | 27.59                                      |
| 313.3                 | 24.31                           | 3.321                             | 6.360                                             | 0.862                                                                   | 13.682                                 | -2.741                            | 0.460                                        | 0.881                                           | 0.119                                                        | 27.57                                      |
| 328.6                 | 25.64                           | 3.286                             | 6.267                                             | 0.955                                                                   | 12.833                                 | -3.283                            | 0.455                                        | 0.868                                           | 0.132                                                        | 27.67                                      |
| 343.9                 | 26.90                           | 3.236                             | 6.184                                             | 1.038                                                                   | 12.048                                 | -3.984                            | 0.448                                        | 0.856                                           | 0.144                                                        | 27.63                                      |
| 359.2                 | 28.21                           | 3.184                             | 6.094                                             | 1.128                                                                   | 11.304                                 | -3.787                            | 0.441                                        | 0.844                                           | 0.156                                                        | 27.59                                      |
| 374.4                 | 29.58                           | 3.135                             | 5.988                                             | 1.234                                                                   | 10.615                                 | -3.581                            | 0.434                                        | 0.829                                           | 0.171                                                        | 27.64                                      |



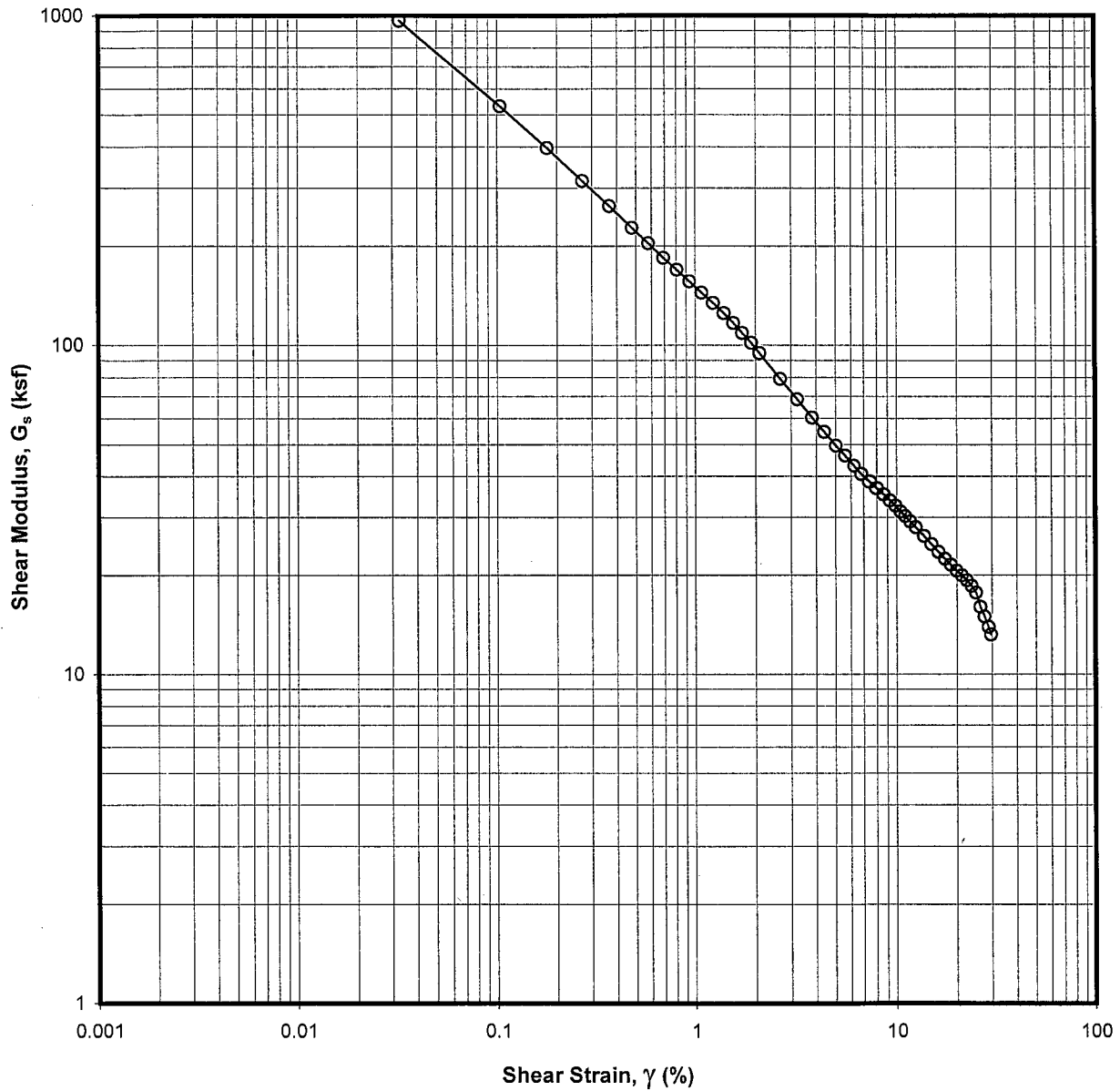
### STATIC DSS TEST

$K_o$  Consolidation - OCR = NA

Sample: UD-12B - Depth: 80.0 - 81.7 ft

Boring B-2359UD

KAW 7/16/08



**STATIC DSS TEST**  
 $K_o$  Consolidation - OCR = NA  
 Sample: UD-12B - Depth: 80.0 - 81.7 ft  
 Boring B-2359UD

KAW 7/16/08

# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 9G File Name: B-2359\_UD12b  
 Task No.: NA Assign,  $\sigma'_{v,c}$  = 7.92 ksf  $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$  = NA  
 Project Name: Exelon (Victoria) Induced OCR = NA  $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$  = NA  
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA  
 Assig. Remarks: Specific Gravity: 2.660 ☒ Meas.; ☐ Assumed

|                                                    |                                         |                                |                                   |                                           |                                           |                             |
|----------------------------------------------------|-----------------------------------------|--------------------------------|-----------------------------------|-------------------------------------------|-------------------------------------------|-----------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping          | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer =     |
| Boring No.: B-2359UD                               |                                         |                                |                                   | <input type="checkbox"/> Impact/Rammer    | Rammer Wgt. (lb) =                        | No. Layers =                |
| Sample No.: UD-12                                  |                                         |                                |                                   | <input type="checkbox"/> Pluviated:       | Tamper Force (lb) =                       | Drop (in.) =                |
| Depth (ft): 80.0 - 81.7                            |                                         |                                |                                   | <input type="checkbox"/> Kneading         | <input type="checkbox"/> Undercompaction: | $U_{ni}$ (%) = Dia. (in.) = |
| <input type="checkbox"/> Spec. Selection by X-ray; |                                         |                                |                                   | <input type="checkbox"/> Geomarine Sample | Ref. Effort =                             | % Comp. = $\pm$ Opt. =      |

|                     |                                               |                                                 |                                          |                                                            |                                                     |
|---------------------|-----------------------------------------------|-------------------------------------------------|------------------------------------------|------------------------------------------------------------|-----------------------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> $K_o$ at: | <input checked="" type="checkbox"/> Incremental | <input type="checkbox"/> Anisotropic at: | <input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$ | <input type="checkbox"/> Used Automated System      |
|                     |                                               | CRS                                             |                                          | 90° Stress Path                                            | Remarks:                                            |
| Loading Conditions: | <input checked="" type="checkbox"/> Static    | <input checked="" type="checkbox"/> Strain      | <input type="checkbox"/> Creep           | <input checked="" type="checkbox"/> Const. Vol./Ht         | <input checked="" type="checkbox"/> Without - Water |
|                     | <input type="checkbox"/> Rapid                | <input type="checkbox"/> Stress                 | <input type="checkbox"/> Post Cyclic     | <input type="checkbox"/> Drained                           | <input type="checkbox"/> With - Bath                |
|                     |                                               |                                                 |                                          |                                                            | Cyclic (Hz) Rate: 0.1; Strain 1; Other:             |

| Water Content (WC);                                      | Initial - Trimming Location |                                                                                                   |                     | Final, $W_{at}$ (see below) | Soil and Ring Masses                                    |               | Initial | Final |
|----------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------|---------------------|-----------------------------|---------------------------------------------------------|---------------|---------|-------|
|                                                          | Top ( $W_{o,1}$ )           | Bottom ( $W_{o,2}$ )                                                                              | Sides ( $W_{o,3}$ ) |                             | Mass Moist Soil + Tare (g)                              | Mass Tare (g) |         |       |
| Container No.                                            | 110                         | 999                                                                                               | 4229                | 917                         | 312.56                                                  | 133.29        |         |       |
| Mass Moist Soil + Cont. (g)                              | 159.69                      | 89.36                                                                                             | 80.06               | 69.16                       | 183.65                                                  | 4.19          |         |       |
| Mass Dry Soil + Container (g)                            | 138.75                      | 80.07                                                                                             | 71.98               | 62.46                       | Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)               | 128.91        | 129.10  |       |
| Mass Container (g)                                       | 31.02                       | 32.10                                                                                             | 30.30               | 31.91                       | Excess Dry Soil (soil not included in final mass above) |               |         |       |
| WATER CONTENT (%)                                        | 19.44                       | 19.37                                                                                             | 19.39               | 21.93                       | Container No.                                           |               |         |       |
| Avg. Initial WC, $W_{o,avg}$ (%)                         | 19.40                       | Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ; <input type="checkbox"/> Whole Spec. |                     |                             | Mass Dry Soil + Container (g)                           |               |         |       |
| See attached data sheet(s) for additional water contents |                             |                                                                                                   |                     |                             | Mass Container (g)                                      |               |         |       |
|                                                          |                             |                                                                                                   |                     |                             | Mass Excess Dry Soil (g)                                |               |         |       |
|                                                          |                             |                                                                                                   |                     |                             | 0.00                                                    |               |         |       |

| Specimen Trimming:                                                                   |                    |                                           |       |
|--------------------------------------------------------------------------------------|--------------------|-------------------------------------------|-------|
| <input type="checkbox"/> Trimming Ring for Fugro Apparatus                           | NL6                | Large-ring ID #                           |       |
| <input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus                  |                    | Small-ring ID #                           |       |
| $H_{s,t}$ (mm):                                                                      | 18.65              | $A_{s,t}$ (cm <sup>2</sup> ):             | 34.68 |
| $D_{s,t}$ (mm):                                                                      | 66.45              | $V_{s,t}$ (cm <sup>3</sup> ):             | 64.67 |
| Remarks:                                                                             |                    |                                           |       |
| <input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm) |                    |                                           |       |
| Height ( $H_{tr}$ )                                                                  | Diameter ( $D_o$ ) | Remarks:                                  |       |
| 1 18.670                                                                             | 1-T NA             | For Free Standing or Reconstituted Spec.: |       |
| 2 18.600                                                                             | 2-M NA             |                                           |       |
| 3 18.680                                                                             | 3-B NA             |                                           |       |
| 4 18.610                                                                             | 1'-T NA            |                                           |       |
| 5 18.630                                                                             | 2'-M NA            |                                           |       |
| Avg.                                                                                 | 3'-B NA            | $A_{tr}$ (cm <sup>2</sup> ):              | NA    |
| = 18.650                                                                             | Avg NA             | $V_{tr}$ (cm <sup>3</sup> ):              | NA    |

| Estimated Initial Unit Weight                 |        |
|-----------------------------------------------|--------|
| Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) = | 124.44 |
| Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =   | 104.23 |

| Specimen Lateral Confinement by:                                         |                                          |                             |                                    |                                                                      |
|--------------------------------------------------------------------------|------------------------------------------|-----------------------------|------------------------------------|----------------------------------------------------------------------|
| Wire Reinforced, Model:                                                  |                                          | Thickness (mm) =            |                                    |                                                                      |
| Stress Level                                                             | Dia. by PiTape (mm) Meas.                | Corr.                       | Area, $A_{c,n}$ (cm <sup>2</sup> ) | (in <sup>2</sup> )                                                   |
| 0                                                                        |                                          |                             |                                    |                                                                      |
| $\sigma'_{v,c}$                                                          |                                          |                             |                                    |                                                                      |
| $\sigma'_{v,max}$                                                        |                                          |                             |                                    |                                                                      |
| <input checked="" type="checkbox"/> Regular Membrane with Ring Set No. 9 | ID, Rings (mm)                           |                             |                                    |                                                                      |
| Thickness (mm):                                                          | Top: 0.58                                | = 67.04                     |                                    |                                                                      |
| <input type="checkbox"/> Single                                          | Bottom: 0.59                             | Corr. for mem.              |                                    |                                                                      |
| <input checked="" type="checkbox"/> Double                               | Membr. Thick. = 0.29                     | = 66.450                    |                                    |                                                                      |
| Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =                          |                                          | 34.68                       | ; (in <sup>2</sup> ) = 5.375       |                                                                      |
| Mass Top Cap, etc., $M_{tc}$ =                                           |                                          | 528.7 g,                    | 1.17 lbf                           |                                                                      |
| Data corr. for $M_{tc}$ :                                                | <input checked="" type="checkbox"/> Yes; | <input type="checkbox"/> No | Plattens with Pins:                | <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No |

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Pale Brown Clayey SAND (SC)

Other Remarks:

|                      |                    |                           |
|----------------------|--------------------|---------------------------|
| Trim./ Recon. By: HC | Setup By: HC       | Take Down By: HC          |
| Date: 3/31/2008      | Date: 3/31/2008    | Date: 4/2/2008            |
| Prelim. Calc. By: HC | Final Calc. By: LF | Reviewed By: HP <b>HP</b> |

Specimen Take Down: ☒ Spec. removed right after shearing  
☐ Spec. unloaded to zero stress with access to water

**KAW 7/16/08**



# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686  
Task Number: NA

Test Station No.: 9G  
Specific Gravity: 2.660

File Name: B-2359\_UD12b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = \_\_\_\_\_ ppm

## Consolidation Stress Summary and Loading Summary

| Test Stage:                                                                                                                                               | Max. Stress | Pre-Shear        | Post Cyclic | <input checked="" type="checkbox"/> Static Strain Rate = <u>NA</u> (%/hr or )                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|-------------|--------------------------------------------------------------------------------------------------|
| Nominal Vertical Stress, $\sigma'_v$ (ksf)                                                                                                                | <u>NA</u>   | <u>7.92</u>      | <u>NA</u>   | Cyclic Rate (Hz): <u>0.1</u> ; <u>1</u> ; Other = _____                                          |
| Axial/Vertical Force, $P_{v,n}$ (lbf)                                                                                                                     | <u>NA</u>   | <u>NA</u>        | <u>NA</u>   | During/End of Loading                                                                            |
| Horizontal Force, $P_{h,n}$ (lbf)                                                                                                                         | <u>NA</u>   | <u>0</u>         | <u>NA</u>   | Change in Height, $\Delta H_{L,n}$ (mm)                                                          |
| Nominal OCR                                                                                                                                               | <u>NA</u>   | <u>NA</u>        | <u>NA</u>   | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> )                                              |
| $t_c$ (ON,days,hrs)                                                                                                                                       | <u>NA</u>   | <u>0.72 days</u> | <u>NA</u>   | Post Cy.Displ. Reset to Null Position: <input type="checkbox"/> Yes; <input type="checkbox"/> No |
| Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u> |             |                  |             |                                                                                                  |

## Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

|                                                                         | Top, $W_{o,1}$ | Bottom, $W_{o,2}$ | Sides, $W_{o,3}$ | Avg., $W_{o,avg}$ | Selct., $W_{o,s}$ | Back Cal.     |
|-------------------------------------------------------------------------|----------------|-------------------|------------------|-------------------|-------------------|---------------|
| $W_o$                                                                   | <u>19.44</u>   | <u>19.37</u>      | <u>19.39</u>     | <u>19.40</u>      | <u>19.40</u>      | <u>21.75</u>  |
| $S_o$                                                                   | <u>87.5</u>    | <u>87.3</u>       | <u>87.4</u>      | <u>87.4</u>       | <u>87.4</u>       | <u>93.1</u>   |
| Measured final mass of moist soil, $M_{t,at}$ (g)                       |                |                   |                  |                   |                   | <u>129.10</u> |
| Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g) |                |                   |                  |                   |                   | <u>129.10</u> |

## Calculated Mass of Dry Soil (g)

|                                    |               |
|------------------------------------|---------------|
| Initial Selected Water Content (%) | <u>19.40</u>  |
| Initial, $M_{d,o}$                 | <u>107.96</u> |
| Final, $M_{d,at}$                  | <u>105.88</u> |
| Selected, $M_d$                    | <u>106.92</u> |

## Initial Back Cal. Specific Gravity (TS):

|                              |  |
|------------------------------|--|
| Selected $S_o$ (%)           |  |
| Selected $W_o$ (%)           |  |
| Specific Gravity, $G_{s,bc}$ |  |

## Height/Volume Change Summary

| Variation in Height & Volume During Consol.                                              | During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$ | During Rebound to $\sigma'_{v,c}$ | Specimen Unloaded After Test To |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------|---------------------------------|
| Stress Units (ksf)                                                                       | <u>7.920</u>                                                     | <u>NA</u>                         | <u>NA</u>                       |
| Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up |                                                                  |                                   |                                 |
| Delta Def. Read., $\Delta d_{ar,n}$ (mm)                                                 | <u>0.523</u>                                                     |                                   |                                 |
| Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)                                         | <u>0.000</u>                                                     |                                   |                                 |
| Corr. Total Def. $\Delta H_{c,n}$ (mm)                                                   | <u>0.523</u>                                                     |                                   |                                 |
| $\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )                                      | <u>1.81</u>                                                      |                                   |                                 |
| $\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )                                   | <u>1.81</u>                                                      |                                   |                                 |
| $\Delta V_n$ using burette meas. (cm <sup>3</sup> )                                      | <u>-0.70</u>                                                     |                                   |                                 |
| Selected $\Delta V_n$ (cm <sup>3</sup> )                                                 | <u>1.81</u>                                                      | <u>NA</u>                         | <u>NA</u> = $\Delta V_{uL}$     |
| After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)              |                                                                  |                                   | <u>NA</u>                       |

## Calculation of $\Delta V_c$ by Different Procedures

| By Selected Volumes             | By Change in Mass                                         |
|---------------------------------|-----------------------------------------------------------|
| $\Delta V_c$ (cm <sup>3</sup> ) | $\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{uL})$ |
| <u>1.81</u>                     | <u>-0.19</u>                                              |
| By Cal. Height & App. Area      | By Saturation = 100% and Spec. Unloaded to 0 Stress       |
| $\Delta V_c$ (cm <sup>3</sup> ) | $\Delta V_c$ (cm <sup>3</sup> )                           |
| <u>1.81</u>                     | <u>NA</u>                                                 |
| By Cal. Ht. & Init. Spec. Area  |                                                           |
| $\Delta V_c$ (cm <sup>3</sup> ) | $\Delta V_c$ (cm <sup>3</sup> )                           |
| <u>1.81</u>                     | <u>NA</u>                                                 |

## Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

|                                                 |               |
|-------------------------------------------------|---------------|
| Assumed Saturation (%)                          | <u>100.00</u> |
| Back Cal. WC before Loading, $W_{c,bc}$ (%)     | <u>21.10</u>  |
| Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%) | <u>NA</u>     |

|                                                 |                                               |                                    |                                    |                                                   |
|-------------------------------------------------|-----------------------------------------------|------------------------------------|------------------------------------|---------------------------------------------------|
| <b>Consolidation &amp; Preshear Conclusions</b> | $\Delta V_c$ (cm <sup>3</sup> ) = <u>1.81</u> | $\Delta H_c$ (mm) = <u>0.523</u>   | $\epsilon_{a,c}$ (%) = <u>2.80</u> | $\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u> |
|                                                 | $V_c$ (cm <sup>3</sup> ) = <u>62.86</u>       | $H_c$ (mm) = <u>18.127</u>         | $\epsilon_{v,c}$ (%) = <u>2.79</u> | $\epsilon_{ac,max}$ (%) = <u>NA</u>               |
|                                                 | $A_c$ (cm <sup>2</sup> ) = <u>34.68</u>       | $\Delta \gamma_c$ (mm) = <u>NA</u> | $\gamma_c$ (%) = <u>NA</u>         | Preshear: $\gamma_{ua}$ (%) = <u>NA</u>           |

## Summary of Specimen Physical Properties:

| Specific Gravity: $G_s = 2.660$ Measured | Height (mm)   | Volume (cm <sup>3</sup> ) | Area (cm <sup>2</sup> ) | Water Content (%) | Total Unit Weight (pcf) | Dry Unit Weight (pcf) | Saturation (%) | Void Ratio, e |
|------------------------------------------|---------------|---------------------------|-------------------------|-------------------|-------------------------|-----------------------|----------------|---------------|
| Condition:                               |               |                           |                         |                   |                         |                       |                |               |
| Initial (as trimmed)                     | <u>18.650</u> | <u>64.67</u>              | <u>34.68</u>            | <u>20.6</u>       | <u>124.4</u>            | <u>103.2</u>          | <u>90.3</u>    | <u>0.609</u>  |
| After to $\sigma'_{v,c}$                 | <u>18.127</u> | <u>62.86</u>              | <u>34.68</u>            | <u>21.1</u>       | <u>128.6</u>            | <u>106.2</u>          | <u>100.0</u>   | <u>0.564</u>  |
| Consol.: to $\sigma'_{v,c,max}$          | <u>NA</u>     | <u>NA</u>                 | <u>NA</u>               | <u>NA</u>         | <u>NA</u>               | <u>NA</u>             | <u>NA</u>      | <u>NA</u>     |

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.  
& Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable  
3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF  
Reviewed By: HP

Remarks: t95 for max stress = 6.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 9G File Name: B-2359\_UD12b  
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

|                                                    |                                           |                                |                                   |                                  |                                           |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-12                                  | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 80.0 - 81.7                            | Specimen No.: B                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: | U <sub>ni</sub> (%) =   |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                             | % Comp. = ± Opt. =      |

|                     |                                                        |                                                 |                                          |                                                                   |                                                     |
|---------------------|--------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> K <sub>o</sub> at: | <input checked="" type="checkbox"/> Incremental | <input type="checkbox"/> Anisotropic at: | <input type="checkbox"/> Inclined Stress Path, K <sub>c,DSS</sub> | <input type="checkbox"/> Used Automated System      |
|                     |                                                        | CRS                                             |                                          | 90° Stress Path                                                   | Remarks:                                            |
| Loading Conditions: | <input checked="" type="checkbox"/> Static             | <input checked="" type="checkbox"/> Strain      | <input type="checkbox"/> Creep           | <input checked="" type="checkbox"/> Const. Vol./Ht                | <input checked="" type="checkbox"/> Without - Water |
|                     | <input type="checkbox"/> Dynamic                       | <input type="checkbox"/> Stress                 | <input type="checkbox"/> Post Cyclic     | <input type="checkbox"/> Drained                                  | <input type="checkbox"/> With - Bath                |
|                     |                                                        |                                                 |                                          |                                                                   | Cyclic (Hz) Rate: 0.1; 1; Other:                    |

| Summary of Specimen Physical Properties              |                |                              |                            |                      |                            |                          |                   |          |           |                  |
|------------------------------------------------------|----------------|------------------------------|----------------------------|----------------------|----------------------------|--------------------------|-------------------|----------|-----------|------------------|
| Specific Gravity:<br>G <sub>s</sub> = 2.660 Measured | Height<br>(mm) | Volume<br>(cm <sup>3</sup> ) | Area<br>(cm <sup>2</sup> ) | Water Content<br>(%) | Total Unit Weight<br>(pcf) | Dry Unit Weight<br>(pcf) | Saturation<br>(%) | LL<br>PL | -200<br>% | Void Ratio,<br>e |
| Condition: Initial                                   | 18.65          | 64.67                        | 34.68                      | 20.57                | 124.4                      | 103.2                    | 90.3              | 26       | 38.8      | 0.609            |
| After to σ' <sub>v,c</sub>                           | 18.13          | 62.86                        | 34.68                      | 21.10                | 128.6                      | 106.2                    | 100.0             | 14       | NA        | 0.564            |
| Consol.: to σ' <sub>vc,max</sub>                     | NA             | NA                           | NA                         | NA                   | NA                         | NA                       | NA                | 12       | NA        | NA               |

| Consolidation Stress Summary and Loading Summary   |       |             |           |             |   |                                                       |  |                     |        |         |
|----------------------------------------------------|-------|-------------|-----------|-------------|---|-------------------------------------------------------|--|---------------------|--------|---------|
| Item                                               | Unit  | Max. Stress | Pre-Shear | Post Cyclic | X | Static Strain Rate = 4.7 %/hr.                        |  |                     |        |         |
| Vert. Consol. Stress, $\sigma'_{v,c}$              | (ksf) | NA          | 8.008     | NA          |   | Cyclic Rate (Hz):                                     |  | 0.1;                | 1;     | Other = |
| Induced OCR:                                       | -     | NA          | NA        | NA          |   | During/End of Loading                                 |  |                     | Static | Cyclic  |
| Axial Strain during Consol., $\epsilon_{a,c}$      | %     | NA          | 2.80      | NA          |   | Change in Height, $\Delta H_{L,n}$ (mm):              |  |                     | NA     | NA      |
| Horiz. Consol. Stress, $\tau_{h,c}$                | (ksf) | NA          | NA        | NA          |   | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ):  |  |                     | NA     | NA      |
| Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$ | -     | NA          | NA        | NA          |   | Post Cy.Displ. Reset to Null Pos.:                    |  |                     | Yes;   | No      |
| Shear Strain during Consol., $\epsilon_{h,c}$      | %     | NA          | NA        | NA          |   | Number of Loading Cycles, N = NA                      |  |                     |        |         |
| Undr. Ambient Shear Stress, $\tau_{h,ua}$          | (ksf) | NA          | NA        | NA          |   | $\pm \tau_h =$ NA (ksf)                               |  | $\pm \gamma =$ NA % |        |         |
| Undr. Ambient Shear Strain, $\epsilon_{ua}$        | %     | NA          | NA        | NA          |   | at end of cyclic loading, $\sigma'_{vc,r} =$ NA (ksf) |  |                     |        |         |

|                                                                                                       |                                                                                          |                                                                                                          |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Weight Top Cap, etc., M <sub>tc</sub> (lb): 1.17                                                      | Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  | Value: 8.008 (ksf)                                                                                       |
| Data corr. for M <sub>tc</sub> : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No | Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No | Using Effective Vertical Stress:                                                                         |
| Wire Reinforced Membrane, Model:                                                                      | Data corr. for Membr. strength                                                           | <input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions |
| <input checked="" type="checkbox"/> Regular Membrane with Rings                                       | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                      | <input type="checkbox"/> Maximum Stress during Consol.                                                   |

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

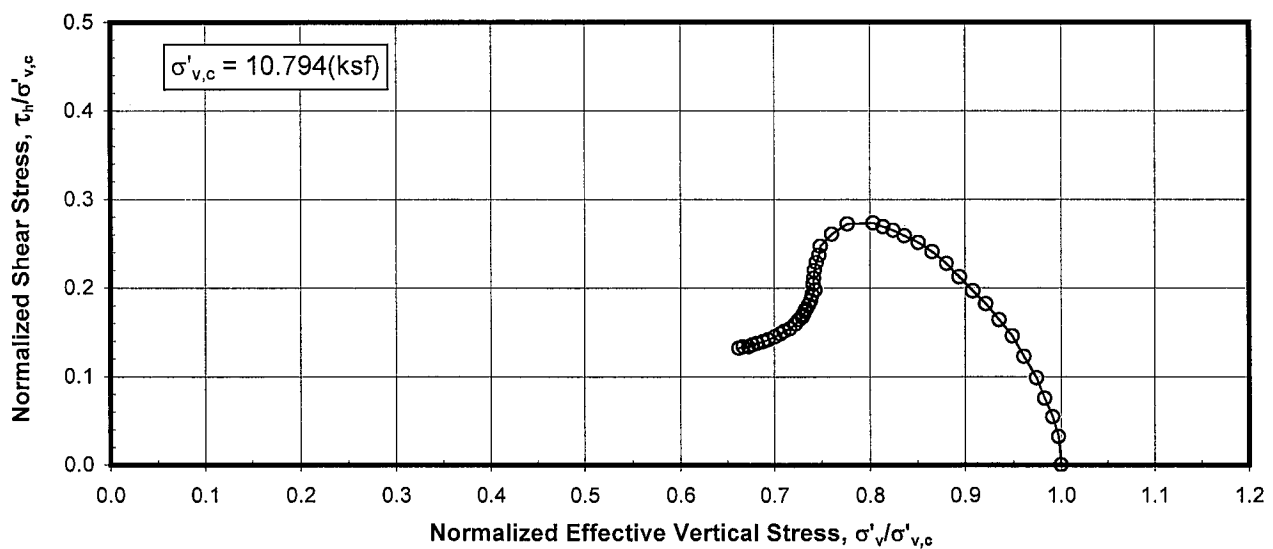
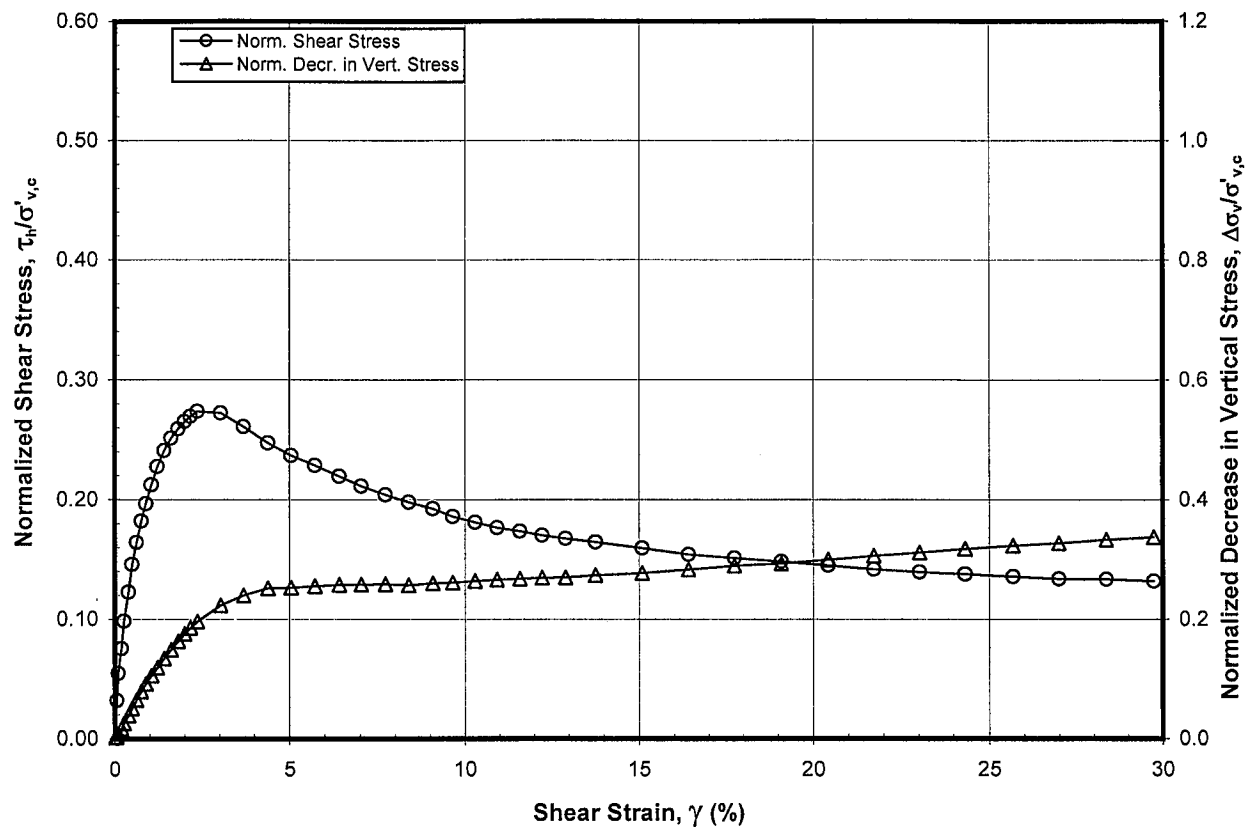
Final Visual Description and Remarks: Pale Brown Clayey SAND (SC)

| Loading Summary      |                         |          |                          |                                 |                                     |                                   |
|----------------------|-------------------------|----------|--------------------------|---------------------------------|-------------------------------------|-----------------------------------|
|                      | τ <sub>h</sub><br>(ksf) | γ<br>(%) | σ' <sub>v</sub><br>(ksf) | τ <sub>h</sub> /σ' <sub>v</sub> | Δσ' <sub>v</sub> /σ' <sub>v,c</sub> | C <sub>u</sub> /σ' <sub>v,c</sub> |
| at Peak Shear Stress | 4.414                   | 24.96    | 7.704                    | 0.573                           | 0.038                               | 0.551                             |
| at Maximum Strain    | 3.918                   | 29.70    | 6.807                    | 0.576                           | 0.150                               | -                                 |

Boring No.: B-2359UD

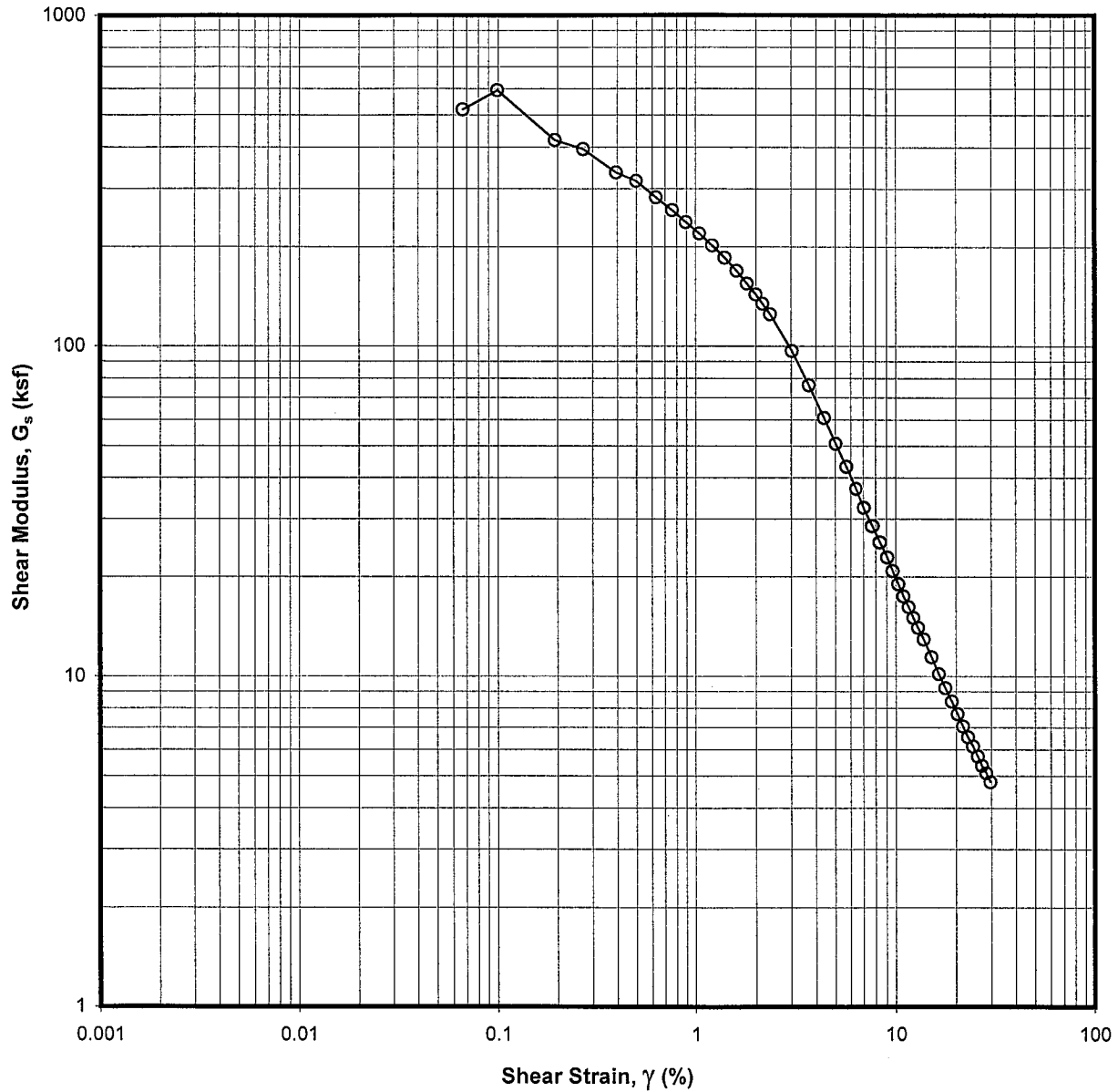
Sample No.: UD-12B

| Elapsed Time | Shear Strain | Shear Stress   | Effective Vertical Stress | Calculated Pore Press. Change       | Secant Shear Modulus | Tangent Modulus | Norm. Shear Stress     | Norm. Vert. Stress        | Norm. Decr. in V. Stress         | Stress Ratio Angle |
|--------------|--------------|----------------|---------------------------|-------------------------------------|----------------------|-----------------|------------------------|---------------------------|----------------------------------|--------------------|
| (min)        | $\gamma$ (%) | $\tau_h$ (ksf) | $\sigma'_v$ (ksf)         | $\Delta U = \Delta \sigma'_v$ (ksf) | $G_s$ (ksf)          | $G_T$ (ksf)     | $\tau_h/\sigma'_{v,c}$ | $\sigma'_v/\sigma'_{v,c}$ | $\Delta \sigma'_v/\sigma'_{v,c}$ | $\phi'_{DSS}$ (°)  |
| 0.0          | 0.00         | -0.001         | 8.008                     | 0.000                               | -                    | -               | 0.000                  | 1.000                     | 0.000                            | 0.00               |
| 2.5          | 0.03         | 0.314          | 8.026                     | -0.019                              | 963.698              | 648.008         | 0.039                  | 1.002                     | -0.002                           | 2.24               |
| 5.1          | 0.10         | 0.551          | 7.993                     | 0.014                               | 530.798              | 270.891         | 0.069                  | 0.998                     | 0.002                            | 3.94               |
| 7.6          | 0.18         | 0.707          | 7.965                     | 0.043                               | 396.482              | 182.010         | 0.088                  | 0.995                     | 0.005                            | 5.07               |
| 10.1         | 0.27         | 0.847          | 7.889                     | 0.118                               | 315.217              | 141.238         | 0.106                  | 0.985                     | 0.015                            | 6.13               |
| 12.6         | 0.37         | 0.974          | 7.779                     | 0.229                               | 264.601              | 114.690         | 0.122                  | 0.971                     | 0.029                            | 7.14               |
| 15.2         | 0.48         | 1.086          | 7.647                     | 0.361                               | 226.985              | 98.244          | 0.136                  | 0.955                     | 0.045                            | 8.08               |
| 17.7         | 0.58         | 1.183          | 7.520                     | 0.487                               | 203.862              | 88.010          | 0.148                  | 0.939                     | 0.061                            | 8.94               |
| 20.2         | 0.69         | 1.272          | 7.385                     | 0.623                               | 184.160              | 80.712          | 0.159                  | 0.922                     | 0.078                            | 9.78               |
| 22.8         | 0.81         | 1.367          | 7.256                     | 0.752                               | 169.089              | 76.963          | 0.171                  | 0.906                     | 0.094                            | 10.67              |
| 25.3         | 0.94         | 1.462          | 7.099                     | 0.909                               | 155.925              | 70.704          | 0.183                  | 0.887                     | 0.113                            | 11.64              |
| 27.8         | 1.08         | 1.560          | 6.918                     | 1.089                               | 144.213              | 65.838          | 0.195                  | 0.864                     | 0.136                            | 12.70              |
| 30.3         | 1.23         | 1.657          | 6.700                     | 1.307                               | 134.295              | 57.609          | 0.207                  | 0.837                     | 0.163                            | 13.89              |
| 32.8         | 1.39         | 1.739          | 6.483                     | 1.525                               | 124.829              | 47.606          | 0.217                  | 0.810                     | 0.190                            | 15.01              |
| 35.4         | 1.55         | 1.807          | 6.286                     | 1.721                               | 116.636              | 40.439          | 0.226                  | 0.785                     | 0.215                            | 16.04              |
| 37.9         | 1.72         | 1.869          | 6.112                     | 1.896                               | 108.876              | 35.436          | 0.233                  | 0.763                     | 0.237                            | 17.01              |
| 40.4         | 1.90         | 1.932          | 5.952                     | 2.056                               | 101.508              | 29.730          | 0.241                  | 0.743                     | 0.257                            | 17.99              |
| 43.0         | 2.10         | 1.982          | 5.804                     | 2.204                               | 94.534               | 23.217          | 0.248                  | 0.725                     | 0.275                            | 18.85              |
| 50.5         | 2.65         | 2.097          | 5.498                     | 2.510                               | 79.068               | 20.127          | 0.262                  | 0.687                     | 0.313                            | 20.88              |
| 58.1         | 3.23         | 2.209          | 5.352                     | 2.656                               | 68.477               | 17.880          | 0.276                  | 0.668                     | 0.332                            | 22.43              |
| 65.7         | 3.83         | 2.307          | 5.262                     | 2.746                               | 60.241               | 16.594          | 0.288                  | 0.657                     | 0.343                            | 23.68              |
| 73.3         | 4.41         | 2.405          | 5.232                     | 2.776                               | 54.573               | 15.728          | 0.300                  | 0.653                     | 0.347                            | 24.69              |
| 80.8         | 5.05         | 2.498          | 5.250                     | 2.758                               | 49.503               | 15.200          | 0.312                  | 0.656                     | 0.344                            | 25.45              |
| 88.4         | 5.62         | 2.588          | 5.289                     | 2.719                               | 46.099               | 15.488          | 0.323                  | 0.661                     | 0.339                            | 26.07              |
| 96.0         | 6.25         | 2.683          | 5.349                     | 2.659                               | 42.962               | 14.799          | 0.335                  | 0.668                     | 0.332                            | 26.64              |
| 103.6        | 6.82         | 2.766          | 5.416                     | 2.592                               | 40.592               | 15.294          | 0.345                  | 0.676                     | 0.324                            | 27.06              |
| 111.1        | 7.45         | 2.868          | 5.505                     | 2.502                               | 38.507               | 15.102          | 0.358                  | 0.687                     | 0.313                            | 27.52              |
| 118.7        | 8.03         | 2.951          | 5.582                     | 2.425                               | 36.730               | 14.928          | 0.368                  | 0.697                     | 0.303                            | 27.86              |
| 126.3        | 8.65         | 3.048          | 5.684                     | 2.324                               | 35.226               | 14.352          | 0.381                  | 0.710                     | 0.290                            | 28.20              |
| 133.9        | 9.27         | 3.128          | 5.761                     | 2.246                               | 33.750               | 13.321          | 0.391                  | 0.719                     | 0.281                            | 28.50              |
| 141.4        | 9.88         | 3.212          | 5.849                     | 2.159                               | 32.499               | 12.204          | 0.401                  | 0.730                     | 0.270                            | 28.77              |
| 149.0        | 10.49        | 3.277          | 5.865                     | 2.143                               | 31.238               | 11.378          | 0.409                  | 0.732                     | 0.268                            | 29.20              |
| 156.6        | 11.08        | 3.348          | 6.008                     | 2.000                               | 30.213               | 10.866          | 0.418                  | 0.750                     | 0.250                            | 29.13              |
| 164.2        | 11.71        | 3.409          | 6.076                     | 1.932                               | 29.116               | 10.412          | 0.426                  | 0.759                     | 0.241                            | 29.30              |
| 174.3        | 12.51        | 3.498          | 6.172                     | 1.835                               | 27.961               | 10.136          | 0.437                  | 0.771                     | 0.229                            | 29.54              |
| 189.4        | 13.73        | 3.610          | 6.321                     | 1.687                               | 26.293               | 8.819           | 0.451                  | 0.789                     | 0.211                            | 29.73              |
| 204.5        | 14.96        | 3.714          | 6.470                     | 1.538                               | 24.826               | 8.055           | 0.464                  | 0.808                     | 0.192                            | 29.86              |
| 219.7        | 16.23        | 3.811          | 6.639                     | 1.369                               | 23.488               | 7.758           | 0.476                  | 0.829                     | 0.171                            | 29.86              |
| 234.8        | 17.47        | 3.909          | 6.807                     | 1.200                               | 22.377               | 8.327           | 0.488                  | 0.850                     | 0.150                            | 29.86              |
| 250.0        | 18.70        | 4.016          | 6.991                     | 1.017                               | 21.486               | 8.234           | 0.502                  | 0.873                     | 0.127                            | 29.88              |
| 265.1        | 19.98        | 4.115          | 7.148                     | 0.860                               | 20.601               | 8.393           | 0.514                  | 0.893                     | 0.107                            | 29.93              |
| 280.3        | 21.23        | 4.229          | 7.340                     | 0.668                               | 19.919               | 8.558           | 0.528                  | 0.917                     | 0.083                            | 29.95              |
| 295.4        | 22.47        | 4.328          | 7.530                     | 0.478                               | 19.267               | 6.688           | 0.540                  | 0.940                     | 0.060                            | 29.89              |
| 310.6        | 23.72        | 4.395          | 7.653                     | 0.354                               | 18.534               | 3.434           | 0.549                  | 0.956                     | 0.044                            | 29.87              |
| 325.7        | 24.96        | 4.414          | 7.704                     | 0.304                               | 17.686               | -7.622          | 0.551                  | 0.962                     | 0.038                            | 29.81              |
| 340.9        | 26.25        | 4.197          | 7.413                     | 0.595                               | 15.990               | -11.537         | 0.524                  | 0.926                     | 0.074                            | 29.52              |
| 356.0        | 27.52        | 4.117          | 7.242                     | 0.765                               | 14.966               | -7.358          | 0.514                  | 0.904                     | 0.096                            | 29.62              |
| 371.2        | 28.82        | 4.007          | 6.996                     | 1.012                               | 13.905               | -9.310          | 0.500                  | 0.874                     | 0.126                            | 29.80              |
| 381.3        | 29.70        | 3.918          | 6.807                     | 1.201                               | 13.195               | -10.222         | 0.489                  | 0.850                     | 0.150                            | 29.93              |



**STATIC DSS TEST**  
 $K_o$  Consolidation - OCR = NA  
 Sample: UD-20B - Depth: 120.0 - 121.7 ft  
 Boring B-2359UD

KAW 7/16/08



### STATIC DSS TEST

$K_o$  Consolidation - OCR = NA

Sample: UD-20B - Depth: 120.0 - 121.7 ft

Boring B-2359UD

KAW 7/16/08

# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 6G File Name: B-2359\_UD20b  
 Task No.: NA Assign,  $\sigma'_{v,c}$  = 10.80 ksf  $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$  = NA  
 Project Name: Exelon (Victoria) Induced OCR = NA  $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$  = NA  
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA  
 Assig. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

|                                                    |                                         |                                           |                                   |                                        |                                                          |                         |
|----------------------------------------------------|-----------------------------------------|-------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded | <input type="checkbox"/> Liner            | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping       | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                               |                                         | <input type="checkbox"/> LPC Core         |                                   | <input type="checkbox"/> Impact/Rammer | Rammer Wgt. (lb) =                                       | No. Layers =            |
| Sample No.: UD-20                                  |                                         | Compostite No.:                           |                                   | <input type="checkbox"/> Pluviated:    | Tamper Force (lb) =                                      | Drop (in.) =            |
| Depth (ft): 120.0 - 121.7                          |                                         | Specimen No.: B                           |                                   | <input type="checkbox"/> Kneading      | <input type="checkbox"/> Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; |                                         | <input type="checkbox"/> Geomarine Sample |                                   |                                        | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

|                     |                                               |                                                 |                                          |                                                            |                                                     |
|---------------------|-----------------------------------------------|-------------------------------------------------|------------------------------------------|------------------------------------------------------------|-----------------------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> $K_o$ at: | <input checked="" type="checkbox"/> Incremental | <input type="checkbox"/> Anisotropic at: | <input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$ | <input type="checkbox"/> Used Automated System      |
|                     |                                               | CRS                                             |                                          | 90° Stress Path                                            | Remarks:                                            |
| Loading Conditions: | <input checked="" type="checkbox"/> Static    | <input checked="" type="checkbox"/> Strain      | <input type="checkbox"/> Creep           | <input checked="" type="checkbox"/> Const. Vol./Ht         | <input checked="" type="checkbox"/> Without - Water |
|                     | <input type="checkbox"/> Rapid                | <input type="checkbox"/> Stress                 | <input type="checkbox"/> Post Cyclic     | <input type="checkbox"/> Drained                           | <input type="checkbox"/> With - Bath                |
|                     |                                               |                                                 |                                          |                                                            | Cyclic (Hz) Rate: 0.1; Strain 1; Stress             |

| Water Content (WC);                                      | Initial - Trimming Location |                                                              |                     | Final, $W_{at}$ (see below) | Soil and Ring Masses                                    | Initial | Final  |
|----------------------------------------------------------|-----------------------------|--------------------------------------------------------------|---------------------|-----------------------------|---------------------------------------------------------|---------|--------|
|                                                          | Top ( $W_{o,1}$ )           | Bottom ( $W_{o,2}$ )                                         | Sides ( $W_{o,3}$ ) |                             |                                                         |         |        |
| Container No.                                            | 191                         | 771                                                          | 4072                | 139                         | Mass Moist Soil + Tare (g)                              | 300.73  | 119.28 |
| Mass Moist Soil + Cont. (g)                              | 48.80                       | 101.92                                                       | 58.17               | 71.63                       | Mass Tare (g)                                           | 183.38  | 4.37   |
| Mass Dry Soil + Container (g)                            | 44.05                       | 83.19                                                        | 50.61               | 60.86                       | Mass Moist Soil, $M_{t,o}$ Mt, at (g)                   | 117.35  | 114.91 |
| Mass Container (g)                                       | 30.75                       | 31.54                                                        | 30.12               | 30.12                       | Excess Dry Soil (soil not included in final mass above) |         |        |
| WATER CONTENT (%)                                        | 35.71                       | 36.26                                                        | 36.90               | 35.04                       | Container No.                                           |         |        |
| Avg. Initial WC, $W_{o,avg}$ (%)                         | 36.29                       | Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ; |                     | Whole Spec.                 | Mass Dry Soil + Container (g)                           |         |        |
| See attached data sheet(s) for additional water contents |                             |                                                              |                     |                             | Mass Container (g)                                      |         |        |
|                                                          |                             |                                                              |                     |                             | Mass Excess Dry Soil (g)                                |         |        |
|                                                          |                             |                                                              |                     |                             | 0.00                                                    |         |        |

| Specimen Trimming:                                                                   |                    |                                           |       |
|--------------------------------------------------------------------------------------|--------------------|-------------------------------------------|-------|
| <input type="checkbox"/> Trimming Ring for Fugro Apparatus                           | NL6                | Large-ring ID #                           |       |
| <input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus                  |                    | Small-ring ID #                           |       |
| $H_{s,t}$ (mm):                                                                      | 18.68              | $A_{s,t}$ (cm <sup>2</sup> ):             | 34.68 |
| $D_{s,t}$ (mm):                                                                      | 66.45              | $V_{s,t}$ (cm <sup>3</sup> ):             | 64.76 |
| Remarks:                                                                             |                    |                                           |       |
| <input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm) |                    |                                           |       |
| Height ( $H_{tr}$ )                                                                  | Diameter ( $D_o$ ) | Remarks:                                  |       |
| 1 18.720                                                                             | 1-T NA             | For Free Standing or Reconstituted Spec.: |       |
| 2 18.660                                                                             | 2-M NA             |                                           |       |
| 3 18.680                                                                             | 3-B NA             |                                           |       |
| 4 18.650                                                                             | 1-T NA             |                                           |       |
| 5 18.650                                                                             | 2-M NA             |                                           |       |
| Avg.                                                                                 | 3-B NA             | $A_{tr}$ (cm <sup>2</sup> ):              | NA    |
| = 18.675                                                                             | Avg NA             | $V_{tr}$ (cm <sup>3</sup> ):              | NA    |

| Estimated Initial Unit Weight                 |        |
|-----------------------------------------------|--------|
| Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) = | 113.13 |
| Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =   | 83.01  |

| Specimen Lateral Confinement by:                                         |                                          |                             |                                    |                                                                      |
|--------------------------------------------------------------------------|------------------------------------------|-----------------------------|------------------------------------|----------------------------------------------------------------------|
| Wire Reinforced, Model:                                                  |                                          | Thickness (mm) =            |                                    |                                                                      |
| Stress Level                                                             | Dia. by PiTape (mm) Meas.                | Corr.                       | Area, $A_{c,n}$ (cm <sup>2</sup> ) | (in <sup>2</sup> )                                                   |
| 0                                                                        |                                          |                             |                                    |                                                                      |
| $\sigma'_{v,c}$                                                          |                                          |                             |                                    |                                                                      |
| $\sigma'_{v,max}$                                                        |                                          |                             |                                    |                                                                      |
| <input checked="" type="checkbox"/> Regular Membrane with Ring Set No. 6 | ID, Rings (mm)                           |                             |                                    |                                                                      |
| Thickness (mm):                                                          | Top: 0.62                                | = 67.09                     |                                    |                                                                      |
| <input type="checkbox"/> Single                                          | Bottom: 0.65                             | Corr. for mem.              |                                    |                                                                      |
| <input checked="" type="checkbox"/> Double                               | Membr. Thick. = 0.32                     | = 66.450                    |                                    |                                                                      |
| Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =                          |                                          | 34.68                       | ; (in <sup>2</sup> ) = 5.375       |                                                                      |
| Mass Top Cap, etc., $M_{tc}$ =                                           |                                          | 526.0 g,                    | 1.16                               | lbf                                                                  |
| Data corr. for $M_{tc}$ :                                                | <input checked="" type="checkbox"/> Yes; | <input type="checkbox"/> No | Plattens with Pins:                | <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No |

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Light Gray Fat CLAY (CH)

Other Remarks :

Trim./ Recon. By: HC  
 Date: 3/30/2008  
 Prelim. Calc. By: HC

Setup By: HC  
 Date: 3/31/2008  
 Final Calc. By: LF

Take Down By: HC  
 Date: 4/1/2008  
 Reviewed By: HP **MP**

Specimen Take Down: ☒ Spec. removed right after shearing  
☐ Spec. unloaded to zero stress with access to water

Remarks:

**KAW 7/16/08**

# DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686  
Task Number: NA

Test Station No.: 6G  
Specific Gravity: 2.720

File Name: B-2359\_UD20b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = \_\_\_\_\_ ppm

## Consolidation Stress Summary and Loading Summary

| Test Stage:                                                                                                                                               | Max. Stress | Pre-Shear | Post Cyclic | <input checked="" type="checkbox"/> | Static Strain Rate =                                | NA   | (%/hr or ) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|-------------|-------------------------------------|-----------------------------------------------------|------|------------|
| Nominal Vertical Stress, $\sigma'_v$ (ksf)                                                                                                                | NA          | 10.8      | NA          |                                     | Cyclic Rate (Hz):                                   | 0.1; | 1; Other = |
| Axial/Vertical Force, $P_{v,n}$ (lbf)                                                                                                                     | NA          | NA        | NA          |                                     | During/End of Loading                               |      |            |
| Horizontal Force, $P_{hr,n}$ (lbf)                                                                                                                        | NA          | 0         | NA          |                                     | Change in Height, $\Delta H_{L,n}$ (mm)             |      |            |
| Nominal OCR                                                                                                                                               | NA          | NA        | NA          |                                     | Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ) |      |            |
| $t_c$ (ON, days, hrs)                                                                                                                                     | NA          | 0.87 days | NA          |                                     | Post Cy. Displ. Reset to Null Position:             |      |            |
|                                                                                                                                                           |             |           |             |                                     |                                                     | Yes; | No         |
| Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u> |             |           |             |                                     |                                                     |      |            |

## Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

|                                                                         | Top, $W_{o,1}$ | Bottom, $W_{o,2}$ | Sides, $W_{o,3}$ | Avg., $W_{o,avg}$ | Selct., $W_{o,s}$ | Back Cal. |
|-------------------------------------------------------------------------|----------------|-------------------|------------------|-------------------|-------------------|-----------|
| $W_o$                                                                   | 35.71          | 36.26             | 36.90            | 36.29             | 36.29             | 37.90     |
| $S_o$                                                                   | 94.0           | 94.7              | 95.5             | 94.7              | 94.7              | 96.7      |
| Measured final mass of moist soil, $M_{lat}$ (g)                        |                |                   |                  |                   |                   | 114.91    |
| Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g) |                |                   |                  |                   |                   | 114.91    |

## Calculated Mass of Dry Soil (g)

|                                    |       |
|------------------------------------|-------|
| Initial Selected Water Content (%) | 36.29 |
| Initial, $M_{d,o}$                 | 86.10 |
| Final, $M_{d,at}$                  | 85.10 |
| Selected, $M_d$                    | 85.60 |

## Initial Back Cal. Specific Gravity (TS):

|                              |  |
|------------------------------|--|
| Selected $S_o$ (%)           |  |
| Selected $W_o$ (%)           |  |
| Specific Gravity, $G_{s,bc}$ |  |

## Height/Volume Change Summary

| Variation in Height & Volume During Consol.                                              | During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$ | During Rebound to $\sigma'_{v,c}$ | Specimen Unloaded After Test To |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------|---------------------------------|
| Stress Units (ksf)                                                                       | 10.800                                                         | NA                                | NA                              |
| Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up |                                                                |                                   |                                 |
| Delta Def. Read., $\Delta d_{ar,n}$ (mm)                                                 | 1.110                                                          |                                   |                                 |
| Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)                                         | 0.000                                                          |                                   |                                 |
| Corr. Total Def. $\Delta H_{c,n}$ (mm)                                                   | 1.110                                                          |                                   |                                 |
| $\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )                                      | 3.85                                                           |                                   |                                 |
| $\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )                                   | 3.85                                                           |                                   |                                 |
| $\Delta V_n$ using burette meas. (cm <sup>3</sup> )                                      | 1.90                                                           |                                   |                                 |
| Selected $\Delta V_n$ (cm <sup>3</sup> )                                                 | 3.85                                                           | NA                                | NA = $\Delta V_{ul}$            |
| After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)              |                                                                |                                   | NA                              |

## Calculation of $\Delta V_c$ by Different Procedures

| By Selected Volumes             |      | By Change in Mass                                         |      |
|---------------------------------|------|-----------------------------------------------------------|------|
| $\Delta V_c$ (cm <sup>3</sup> ) | 3.85 | $\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{ul})$ |      |
| By Cal. Height & App. Area      |      | $\Delta V_c$ (cm <sup>3</sup> )                           | 2.44 |
| $\Delta V_c$ (cm <sup>3</sup> ) | 3.85 | By Saturation = 100% and Spec. Unloaded to 0 Stress       |      |
| By Cal. Ht. & Init. Spec. Area  |      | $\Delta V_c$ (cm <sup>3</sup> )                           | NA   |
| $\Delta V_c$ (cm <sup>3</sup> ) | 3.85 |                                                           |      |

## Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

|                                                 |        |
|-------------------------------------------------|--------|
| Assumed Saturation (%)                          | 100.00 |
| Back Cal. WC before Loading, $W_{c,bc}$ (%)     | 34.27  |
| Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%) | NA     |

|                                     |                                   |       |                          |        |                           |      |                                         |    |
|-------------------------------------|-----------------------------------|-------|--------------------------|--------|---------------------------|------|-----------------------------------------|----|
| <b>Consolidation &amp; Preshear</b> | $\Delta V_c$ (cm <sup>3</sup> ) = | 3.84  | $\Delta H_c$ (mm) =      | 1.110  | $\varepsilon_{a,c}$ (%) = | 5.94 | $\Delta V_{c,max}$ (cm <sup>3</sup> ) = | NA |
|                                     | $V_c$ (cm <sup>3</sup> ) =        | 60.92 | $H_c$ (mm) =             | 17.565 | $\varepsilon_{v,c}$ (%) = | 5.93 | $\varepsilon_{ac,max}$ (%) =            | NA |
|                                     | $A_c$ (cm <sup>2</sup> ) =        | 34.68 | $\Delta \gamma_c$ (mm) = | NA     | $\gamma_c$ (%) =          | NA   | Preshear: $\gamma_{ua}$ (%) =           | NA |

## Summary of Specimen Physical Properties:

| Specific Gravity: $G_s = 2.720$ Measured | Height (mm) | Volume (cm <sup>3</sup> ) | Area (cm <sup>2</sup> ) | Water Content (%) | Total Unit Weight (pcf) | Dry Unit Weight (pcf) | Saturation (%) | Void Ratio, e |
|------------------------------------------|-------------|---------------------------|-------------------------|-------------------|-------------------------|-----------------------|----------------|---------------|
| Condition:                               |             |                           |                         |                   |                         |                       |                |               |
| Initial (as trimmed)                     | 18.675      | 64.76                     | 34.68                   | 37.1              | 113.1                   | 82.5                  | 95.7           | 1.058         |
| After to $\sigma'_{v,c}$                 | 17.565      | 60.92                     | 34.68                   | 34.3              | 117.8                   | 87.7                  | 100.0          | 0.935         |
| Consol.: to $\sigma'_{v,max}$            | NA          | NA                        | NA                      | NA                | NA                      | NA                    | NA             | NA            |

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 26.4 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 6G File Name: B-2359\_UD20b  
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

|                                                    |                                           |                                |                                   |                                        |                                           |                                    |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------------|-------------------------------------------|------------------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping       | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer =            |
| Boring No.: B-2359UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | <input type="checkbox"/> Impact/Rammer | Rammer Wgt.(lb)=                          | No. Layers =                       |
| Sample No.: UD-20                                  | Compostite No.:                           |                                |                                   | <input type="checkbox"/> Pluviated:    | Tamper Force (lb)=                        | Drop (in.) =                       |
| Depth (ft): 120.0 - 121.7                          | Specimen No.: B                           |                                |                                   | <input type="checkbox"/> Kneading      | <input type="checkbox"/> Undercompaction: | U <sub>ni</sub> (%) = Dia. (in.) = |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                        | Ref. Effort=                              | % Comp. = ± Opt.=                  |

|                     |                                                        |                                                 |                                          |                                                                   |                                                     |
|---------------------|--------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|
| Type Consolidation: | <input checked="" type="checkbox"/> K <sub>o</sub> at: | <input checked="" type="checkbox"/> Incremental | <input type="checkbox"/> Anisotropic at: | <input type="checkbox"/> Inclined Stress Path, K <sub>c,DSS</sub> | <input type="checkbox"/> Used Automated System      |
|                     |                                                        | CRS                                             |                                          | 90° Stress Path                                                   | Remarks:                                            |
| Loading Conditions: | <input checked="" type="checkbox"/> Static             | <input checked="" type="checkbox"/> Strain      | <input type="checkbox"/> Creep           | <input checked="" type="checkbox"/> Const. Vol./Ht                | <input checked="" type="checkbox"/> Without - Water |
|                     | <input type="checkbox"/> Dynamic                       | <input type="checkbox"/> Stress                 | <input type="checkbox"/> Post Cyclic     | <input type="checkbox"/> Drained                                  | <input type="checkbox"/> With - Bath                |
|                     |                                                        |                                                 |                                          |                                                                   | Cyclic (Hz) Rate: 0.1; 1; Other:                    |

| Summary of Specimen Physical Properties              |                |                              |                            |                         |                      |      |                   |          |           |                  |
|------------------------------------------------------|----------------|------------------------------|----------------------------|-------------------------|----------------------|------|-------------------|----------|-----------|------------------|
| Specific Gravity:<br>G <sub>s</sub> = 2.720 Measured | Height<br>(mm) | Volume<br>(cm <sup>3</sup> ) | Area<br>(cm <sup>2</sup> ) | Water<br>Content<br>(%) | Unit Weight<br>(pcf) |      | Saturation<br>(%) | LL<br>PL | -200<br>% | Void Ratio,<br>e |
| Condition:                                           |                |                              |                            |                         | Total                | Dry  |                   | PI       |           |                  |
| Initial                                              | 18.68          | 64.76                        | 34.68                      | 37.09                   | 113.1                | 82.5 | 95.7              | 51       | 95.4      | 1.058            |
| After to σ' <sub>v,c</sub>                           | 17.57          | 60.92                        | 34.68                      | 34.27                   | 117.8                | 87.7 | 100.0             | 15       | NA        | 0.935            |
| Consol.: to σ' <sub>vc,max</sub>                     | NA             | NA                           | NA                         | NA                      | NA                   | NA   | NA                | 36       | NA        | NA               |

| Consolidation Stress Summary and Loading Summary          |       |             |           |             |                                                                    |      |           |         |  |  |
|-----------------------------------------------------------|-------|-------------|-----------|-------------|--------------------------------------------------------------------|------|-----------|---------|--|--|
| Item                                                      | Unit  | Max. Stress | Pre-Shear | Post Cyclic | <input checked="" type="checkbox"/> Static Strain Rate = 4.9 %/hr. |      |           |         |  |  |
| Vert. Consol. Stress, σ' <sub>v,c</sub>                   | (ksf) | NA          | 10.794    | NA          | Cyclic Rate (Hz):                                                  | 0.1; | 1;        | Other = |  |  |
| Induced OCR:                                              | -     | NA          | NA        | NA          | During/End of Loading                                              |      | Static    | Cyclic  |  |  |
| Axial Strain during Consol., ε <sub>ac</sub>              | %     | NA          | 5.94      | NA          | Change in Height, ΔH <sub>L,n</sub> (mm):                          |      | NA        | NA      |  |  |
| Horiz. Consol. Stress, τ <sub>hc</sub>                    | (ksf) | NA          | NA        | NA          | Change in Vol., ΔV <sub>L,n</sub> (cm <sup>3</sup> ):              |      | NA        | NA      |  |  |
| Consol. Stress Ratio, τ <sub>hc</sub> / σ' <sub>v,c</sub> | -     | NA          | NA        | NA          | Post Cy. Displ. Reset to Null Pos.:                                |      | Yes;      | No      |  |  |
| Shear Strain during Consol., ε <sub>hc</sub>              | %     | NA          | NA        | NA          | Number of Loading Cycles, N =                                      |      | NA        |         |  |  |
| Undr. Ambient Shear Stress, τ <sub>h,un</sub>             | (ksf) | NA          | NA        | NA          | ±τ <sub>h</sub> = NA (ksf)                                         |      | ±γ = NA % |         |  |  |
| Undr. Ambient Shear Strain, ε <sub>hu</sub>               | %     | NA          | NA        | NA          | at end of cyclic loading, σ' <sub>vc,y</sub> =                     |      | NA (ksf)  |         |  |  |

|                                                                                                       |                                                                                                             |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Weight Top Cap, etc., M <sub>tc</sub> (lb): 1.16                                                      | Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: 10.794 (ksf) |
| Data corr. for M <sub>tc</sub> : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No | Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No                    |
| Wire Reinforced Membrane, Model:                                                                      | Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No         |
| <input checked="" type="checkbox"/> Regular Membrane with Rings                                       | <input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions    |
|                                                                                                       | <input type="checkbox"/> Maximum Stress during Consol.                                                      |

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

Final Visual Description and Remarks: Light Gray Fat CLAY (CH)

| Loading Summary      |                         |          |                          |                                 |                                     |                                   |
|----------------------|-------------------------|----------|--------------------------|---------------------------------|-------------------------------------|-----------------------------------|
|                      | τ <sub>h</sub><br>(ksf) | γ<br>(%) | σ' <sub>v</sub><br>(ksf) | τ <sub>h</sub> /σ' <sub>v</sub> | Δσ' <sub>v</sub> /σ' <sub>v,c</sub> | c <sub>u</sub> /σ' <sub>v,c</sub> |
| at Peak Shear Stress | 2.951                   | 2.36     | 8.675                    | 0.340                           | 0.196                               | 0.273                             |
| at Maximum Strain    | 1.424                   | 29.74    | 7.149                    | 0.199                           | 0.338                               | -                                 |



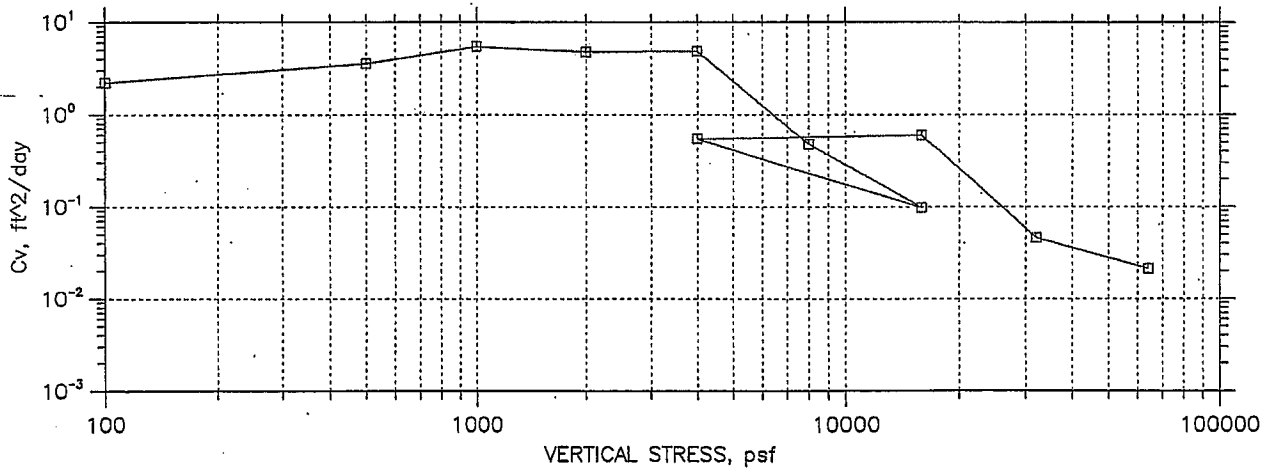
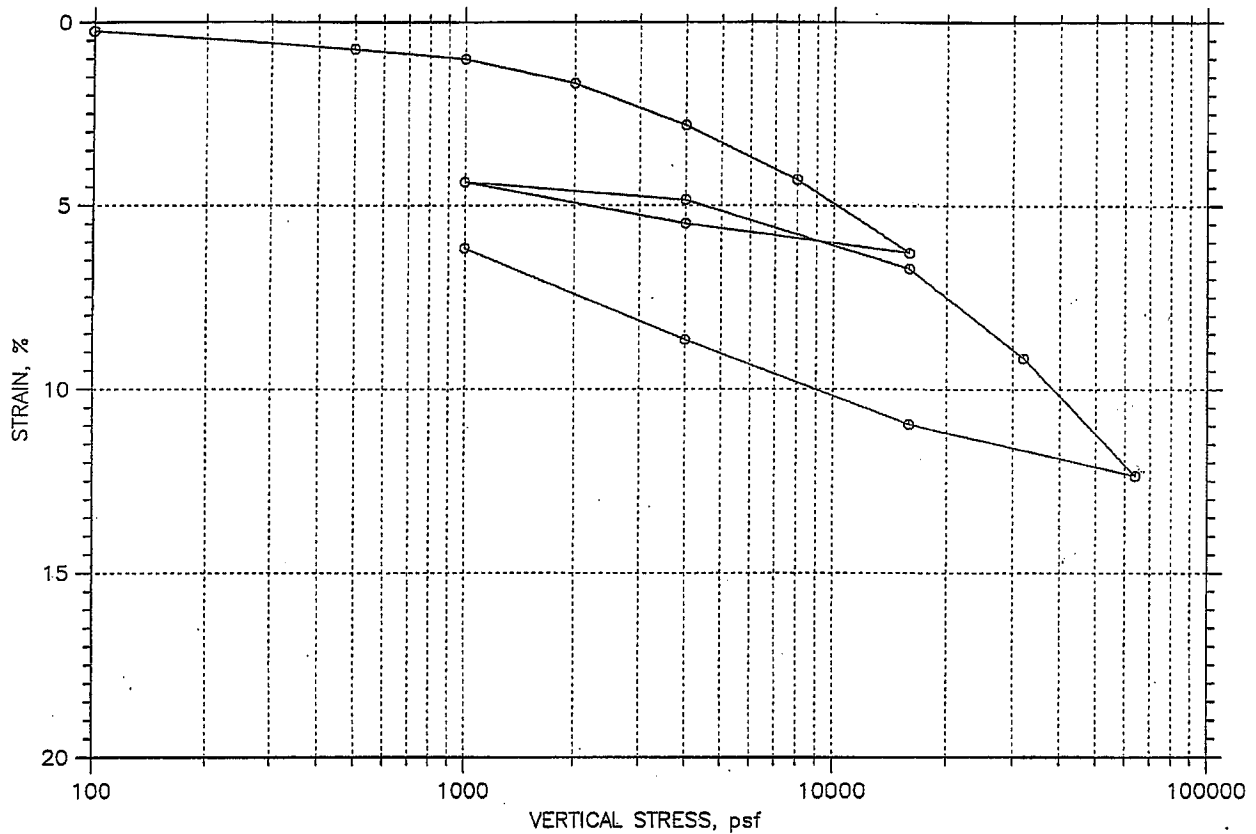
Boring No.: B-2359UD

Sample No.: UD-20B

| Elapsed Time<br>(min) | Shear Strain<br>$\gamma$<br>(%) | Shear Stress<br>$\tau_h$<br>(ksf) | Effective Vertical Stress<br>$\sigma'_v$<br>(ksf) | Calculated Pore Press. Change<br>$\Delta U = \Delta \sigma'_v$<br>(ksf) | Secant Shear Modulus<br>$G_s$<br>(ksf) | Tangent Modulus<br>$G_T$<br>(ksf) | Norm. Shear Stress<br>$\tau_h/\sigma'_{v,c}$ | Norm. Vert. Stress<br>$\sigma'_v/\sigma'_{v,c}$ | Norm. Decr. in V. Stress<br>$\Delta \sigma'_v/\sigma'_{v,c}$ | Stress Ratio Angle<br>$\phi'_{bss}$<br>(°) |
|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------|-----------------------------------|----------------------------------------------|-------------------------------------------------|--------------------------------------------------------------|--------------------------------------------|
| 0.0                   | 0.00                            | -0.002                            | 10.794                                            | 0.000                                                                   | -                                      | -                                 | 0.000                                        | 1.000                                           | 0.000                                                        | -0.01                                      |
| 2.6                   | 0.07                            | 0.345                             | 10.765                                            | 0.029                                                                   | 518.520                                | 633.262                           | 0.032                                        | 0.997                                           | 0.003                                                        | 1.84                                       |
| 5.2                   | 0.10                            | 0.589                             | 10.700                                            | 0.094                                                                   | 593.794                                | 492.574                           | 0.055                                        | 0.991                                           | 0.009                                                        | 3.15                                       |
| 7.8                   | 0.19                            | 0.813                             | 10.611                                            | 0.183                                                                   | 420.166                                | 282.474                           | 0.075                                        | 0.983                                           | 0.017                                                        | 4.38                                       |
| 10.4                  | 0.27                            | 1.061                             | 10.520                                            | 0.274                                                                   | 394.268                                | 268.226                           | 0.098                                        | 0.975                                           | 0.025                                                        | 5.76                                       |
| 13.0                  | 0.40                            | 1.323                             | 10.376                                            | 0.418                                                                   | 335.289                                | 226.028                           | 0.123                                        | 0.961                                           | 0.039                                                        | 7.27                                       |
| 15.6                  | 0.50                            | 1.574                             | 10.246                                            | 0.548                                                                   | 316.271                                | 196.985                           | 0.146                                        | 0.949                                           | 0.051                                                        | 8.73                                       |
| 18.3                  | 0.63                            | 1.771                             | 10.093                                            | 0.701                                                                   | 281.790                                | 147.537                           | 0.164                                        | 0.935                                           | 0.065                                                        | 9.95                                       |
| 20.9                  | 0.76                            | 1.964                             | 9.944                                             | 0.850                                                                   | 257.765                                | 131.793                           | 0.182                                        | 0.921                                           | 0.079                                                        | 11.17                                      |
| 23.5                  | 0.89                            | 2.121                             | 9.803                                             | 0.991                                                                   | 237.319                                | 115.744                           | 0.196                                        | 0.908                                           | 0.092                                                        | 12.21                                      |
| 26.1                  | 1.05                            | 2.292                             | 9.654                                             | 1.140                                                                   | 219.172                                | 103.567                           | 0.212                                        | 0.894                                           | 0.106                                                        | 13.35                                      |
| 28.7                  | 1.22                            | 2.454                             | 9.509                                             | 1.285                                                                   | 201.675                                | 86.328                            | 0.227                                        | 0.881                                           | 0.119                                                        | 14.47                                      |
| 31.3                  | 1.40                            | 2.598                             | 9.345                                             | 1.449                                                                   | 185.315                                | 66.870                            | 0.241                                        | 0.866                                           | 0.134                                                        | 15.54                                      |
| 33.9                  | 1.61                            | 2.711                             | 9.188                                             | 1.606                                                                   | 169.003                                | 48.181                            | 0.251                                        | 0.851                                           | 0.149                                                        | 16.44                                      |
| 36.5                  | 1.81                            | 2.793                             | 9.031                                             | 1.763                                                                   | 154.591                                | 38.014                            | 0.259                                        | 0.837                                           | 0.163                                                        | 17.19                                      |
| 39.1                  | 2.00                            | 2.861                             | 8.902                                             | 1.892                                                                   | 143.240                                | 31.025                            | 0.265                                        | 0.825                                           | 0.175                                                        | 17.82                                      |
| 41.7                  | 2.16                            | 2.905                             | 8.790                                             | 2.005                                                                   | 134.371                                | 24.787                            | 0.269                                        | 0.814                                           | 0.186                                                        | 18.29                                      |
| 44.3                  | 2.36                            | 2.951                             | 8.675                                             | 2.119                                                                   | 124.882                                | 10.476                            | 0.273                                        | 0.804                                           | 0.196                                                        | 18.79                                      |
| 52.2                  | 3.04                            | 2.937                             | 8.382                                             | 2.412                                                                   | 96.765                                 | -10.456                           | 0.272                                        | 0.777                                           | 0.223                                                        | 19.31                                      |
| 60.0                  | 3.69                            | 2.813                             | 8.207                                             | 2.587                                                                   | 76.226                                 | -19.887                           | 0.261                                        | 0.760                                           | 0.240                                                        | 18.92                                      |
| 67.8                  | 4.40                            | 2.667                             | 8.078                                             | 2.716                                                                   | 60.696                                 | -19.007                           | 0.247                                        | 0.748                                           | 0.252                                                        | 18.27                                      |
| 75.6                  | 5.05                            | 2.555                             | 8.065                                             | 2.729                                                                   | 50.654                                 | -15.144                           | 0.237                                        | 0.747                                           | 0.253                                                        | 17.58                                      |
| 83.4                  | 5.72                            | 2.467                             | 8.036                                             | 2.758                                                                   | 43.189                                 | -13.662                           | 0.229                                        | 0.744                                           | 0.256                                                        | 17.07                                      |
| 91.2                  | 6.41                            | 2.369                             | 8.016                                             | 2.779                                                                   | 37.009                                 | -14.384                           | 0.220                                        | 0.743                                           | 0.257                                                        | 16.47                                      |
| 99.1                  | 7.03                            | 2.278                             | 8.008                                             | 2.786                                                                   | 32.406                                 | -12.821                           | 0.211                                        | 0.742                                           | 0.258                                                        | 15.88                                      |
| 106.9                 | 7.73                            | 2.201                             | 8.001                                             | 2.793                                                                   | 28.495                                 | -10.648                           | 0.204                                        | 0.741                                           | 0.259                                                        | 15.38                                      |
| 114.7                 | 8.38                            | 2.134                             | 8.022                                             | 2.772                                                                   | 25.468                                 | -9.297                            | 0.198                                        | 0.743                                           | 0.257                                                        | 14.89                                      |
| 122.5                 | 9.08                            | 2.076                             | 7.986                                             | 2.808                                                                   | 22.891                                 | -10.236                           | 0.192                                        | 0.740                                           | 0.260                                                        | 14.57                                      |
| 130.3                 | 9.65                            | 2.006                             | 7.974                                             | 2.820                                                                   | 20.806                                 | -10.234                           | 0.186                                        | 0.739                                           | 0.261                                                        | 14.12                                      |
| 138.1                 | 10.29                           | 1.953                             | 7.947                                             | 2.848                                                                   | 18.995                                 | -7.972                            | 0.181                                        | 0.736                                           | 0.264                                                        | 13.81                                      |
| 146.0                 | 10.93                           | 1.905                             | 7.922                                             | 2.872                                                                   | 17.448                                 | -6.116                            | 0.176                                        | 0.734                                           | 0.266                                                        | 13.52                                      |
| 153.8                 | 11.59                           | 1.874                             | 7.908                                             | 2.887                                                                   | 16.182                                 | -5.351                            | 0.174                                        | 0.733                                           | 0.267                                                        | 13.33                                      |
| 161.6                 | 12.23                           | 1.835                             | 7.888                                             | 2.906                                                                   | 15.013                                 | -5.100                            | 0.170                                        | 0.731                                           | 0.269                                                        | 13.10                                      |
| 169.4                 | 12.91                           | 1.807                             | 7.880                                             | 2.914                                                                   | 14.012                                 | -3.860                            | 0.167                                        | 0.730                                           | 0.270                                                        | 12.92                                      |
| 179.8                 | 13.77                           | 1.776                             | 7.843                                             | 2.951                                                                   | 12.912                                 | -3.899                            | 0.165                                        | 0.727                                           | 0.273                                                        | 12.76                                      |
| 195.4                 | 15.09                           | 1.721                             | 7.803                                             | 2.992                                                                   | 11.415                                 | -4.283                            | 0.159                                        | 0.723                                           | 0.277                                                        | 12.44                                      |
| 211.1                 | 16.42                           | 1.663                             | 7.736                                             | 3.058                                                                   | 10.136                                 | -3.368                            | 0.154                                        | 0.717                                           | 0.283                                                        | 12.13                                      |
| 226.7                 | 17.74                           | 1.631                             | 7.670                                             | 3.124                                                                   | 9.203                                  | -2.370                            | 0.151                                        | 0.711                                           | 0.289                                                        | 12.01                                      |
| 242.3                 | 19.10                           | 1.599                             | 7.631                                             | 3.163                                                                   | 8.380                                  | -2.435                            | 0.148                                        | 0.707                                           | 0.293                                                        | 11.83                                      |
| 257.9                 | 20.42                           | 1.566                             | 7.563                                             | 3.232                                                                   | 7.677                                  | -2.612                            | 0.145                                        | 0.701                                           | 0.299                                                        | 11.70                                      |
| 273.5                 | 21.72                           | 1.530                             | 7.492                                             | 3.302                                                                   | 7.052                                  | -2.382                            | 0.142                                        | 0.694                                           | 0.306                                                        | 11.55                                      |
| 289.2                 | 23.03                           | 1.504                             | 7.431                                             | 3.363                                                                   | 6.538                                  | -1.656                            | 0.139                                        | 0.688                                           | 0.312                                                        | 11.44                                      |
| 304.8                 | 24.33                           | 1.487                             | 7.365                                             | 3.430                                                                   | 6.120                                  | -1.456                            | 0.138                                        | 0.682                                           | 0.318                                                        | 11.42                                      |
| 320.4                 | 25.67                           | 1.465                             | 7.308                                             | 3.486                                                                   | 5.714                                  | -1.568                            | 0.136                                        | 0.677                                           | 0.323                                                        | 11.34                                      |
| 336.0                 | 26.99                           | 1.445                             | 7.261                                             | 3.533                                                                   | 5.361                                  | -0.889                            | 0.134                                        | 0.673                                           | 0.327                                                        | 11.26                                      |
| 351.7                 | 28.37                           | 1.442                             | 7.199                                             | 3.596                                                                   | 5.088                                  | -0.772                            | 0.134                                        | 0.667                                           | 0.333                                                        | 11.33                                      |
| 367.3                 | 29.74                           | 1.424                             | 7.149                                             | 3.645                                                                   | 4.794                                  | -1.281                            | 0.132                                        | 0.662                                           | 0.338                                                        | 11.27                                      |

# **Consolidation (Load Controlled) Tests – Undisturbed Samples**

# CONSOLIDATION TEST DATA SUMMARY REPORT

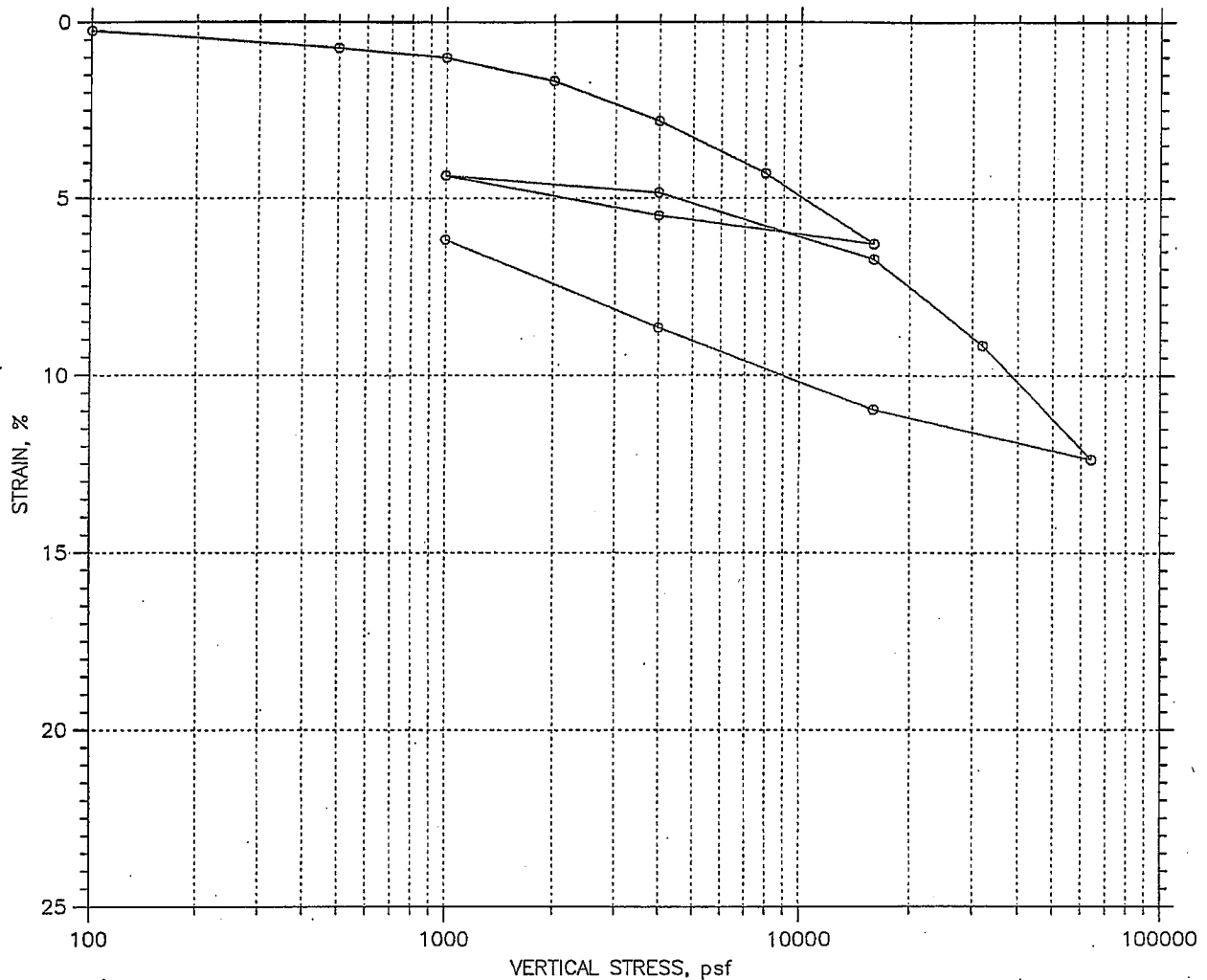


|                                |                                                                     |                          |                                   |
|--------------------------------|---------------------------------------------------------------------|--------------------------|-----------------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                  | Location: B-2302UD UD-11 | Project No.: 6468071777           |
|                                | Boring No.: B-2302UD                                                | Tested By: BM            | Checked By: JW <i>[Signature]</i> |
|                                | Sample No.: UD-11                                                   | Test Date: 4/07/08       | Depth: 69.5-71.5'                 |
|                                | Test No.: 8576                                                      | Sample Type: Undisturbed | Elevation: N/A <i>4/15/08</i>     |
|                                | Description: Light Gray Mottled Light Yellowish Brown Fat CLAY (CH) |                          |                                   |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                |                          |                                   |
|                                | Cr= 0.025                                                           |                          |                                   |

Tue, 15-APR-2008 16:23:58

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# CONSOLIDATION TEST DATA SUMMARY REPORT

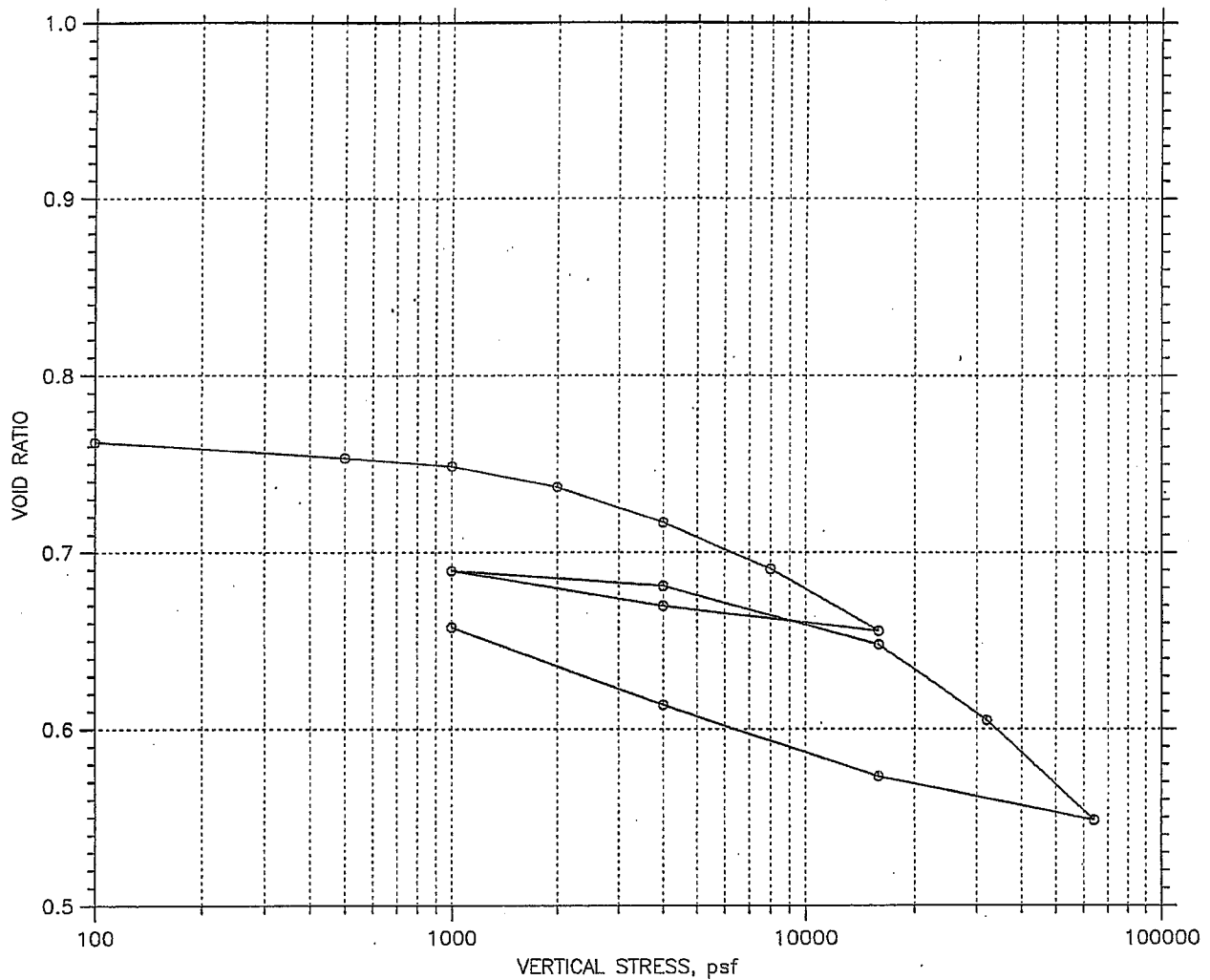


|                                          |  |                   |  | Before Test | After Test |
|------------------------------------------|--|-------------------|--|-------------|------------|
| Overburden Pressure: 7500 psf            |  |                   |  | 24.19       | 23.97      |
| Preconsolidation Pressure: 1.27e+004 psf |  |                   |  | 96.82       | 103.2      |
| Compression Index: 0.189                 |  |                   |  | 86.46       | 99.89      |
| Diameter: 2.499 in                       |  | Height: 0.9931 in |  | Void Ratio  |            |
| LL: 59                                   |  | PL: 25            |  | 0.77        |            |
| PI: 34                                   |  | GS: 2.74          |  | 0.66        |            |

|                                                      |                                                                     |                          |                         |
|------------------------------------------------------|---------------------------------------------------------------------|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria                                  | Location: B-2302UD UD-11 | Project No.: 6468071777 |
|                                                      | Boring No.: B-2302UD                                                | Tested By: BM            | Checked By: JW          |
|                                                      | Sample No.: UD-11                                                   | Test Date: 4/07/08       | Depth: 69.5-71.5'       |
|                                                      | Test No.: 8576                                                      | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Light Gray Mottled Light Yellowish Brown Fat CLAY (CH) |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                                                     |                          | Cr= 0.025               |

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# CONSOLIDATION TEST DATA SUMMARY REPORT

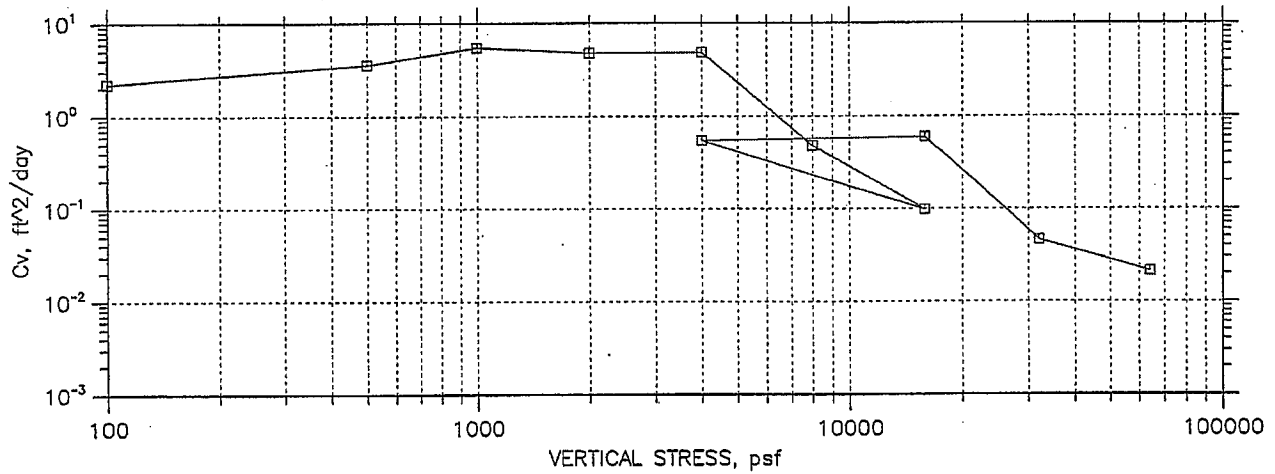
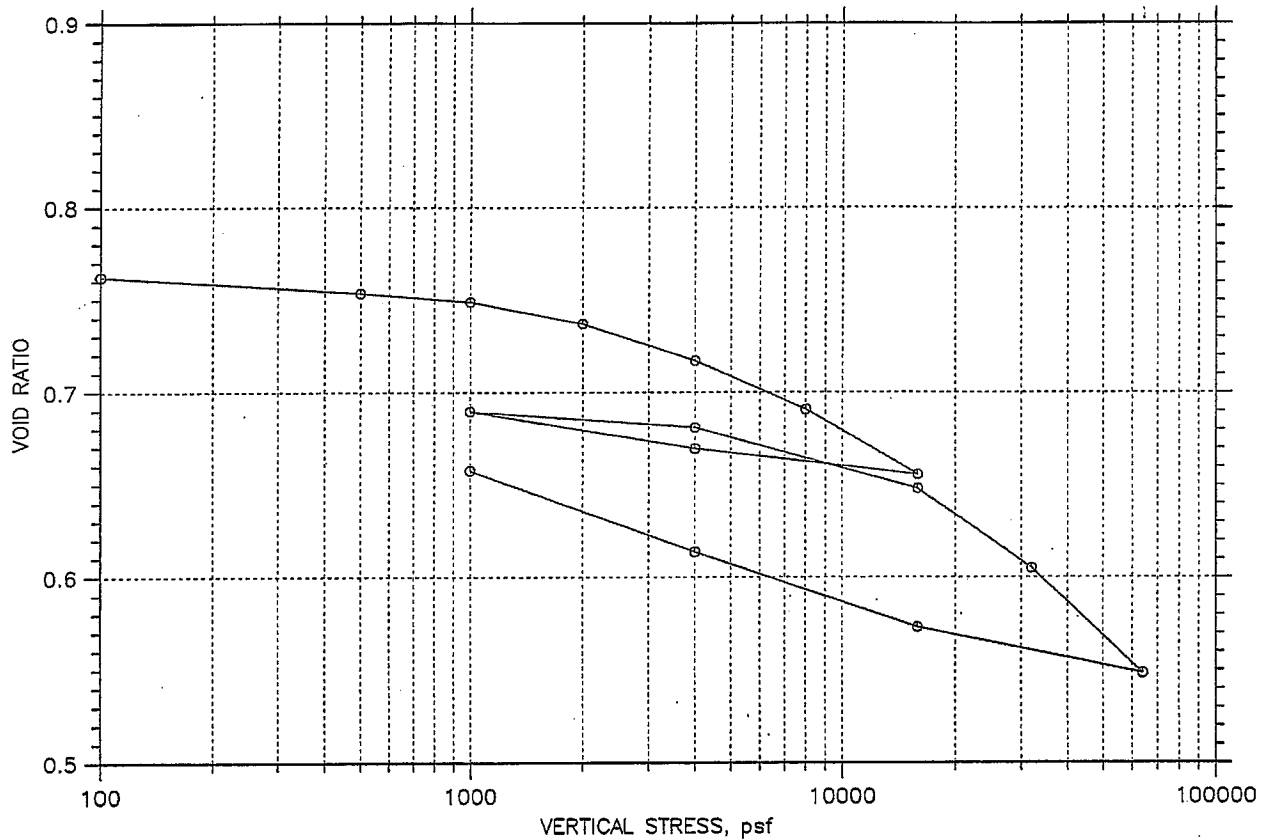


|                                          |        |                   |          | Before Test | After Test |
|------------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 7500 psf            |        |                   |          | 24.19       | 23.97      |
| Preconsolidation Pressure: 1.27e+004 psf |        |                   |          | 96.82       | 103.2      |
| Compression Index: 0.189                 |        |                   |          | 86.46       | 99.89      |
| Diameter: 2.499 in                       |        | Height: 0.9931 in |          | 0.77        | 0.66       |
| LL: 59                                   | PL: 25 | PI: 34            | GS: 2.74 |             |            |

|                                            |                                                                     |                          |                         |
|--------------------------------------------|---------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                  | Location: B-2302UD UD-11 | Project No.: 6468071777 |
|                                            | Boring No.: B-2302UD                                                | Tested By: BM            | Checked By: JW          |
|                                            | Sample No.: UD-11                                                   | Test Date: 4/07/08       | Depth: 69.5-71.5'       |
|                                            | Test No.: 8576                                                      | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Light Gray Mottled Light Yellowish Brown Fat CLAY (CH) |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                |                          |                         |
|                                            |                                                                     |                          | Cr= 0.025               |

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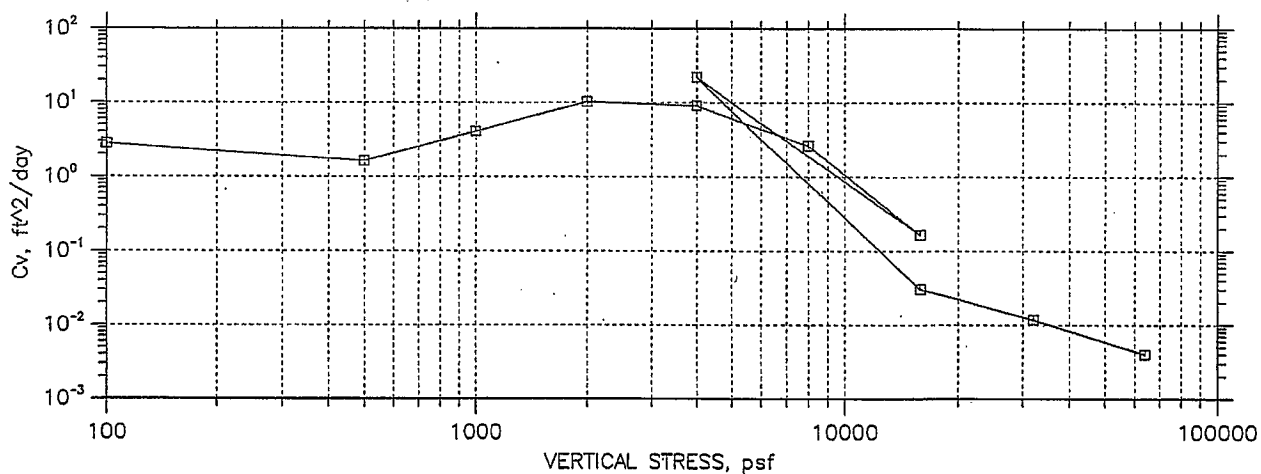
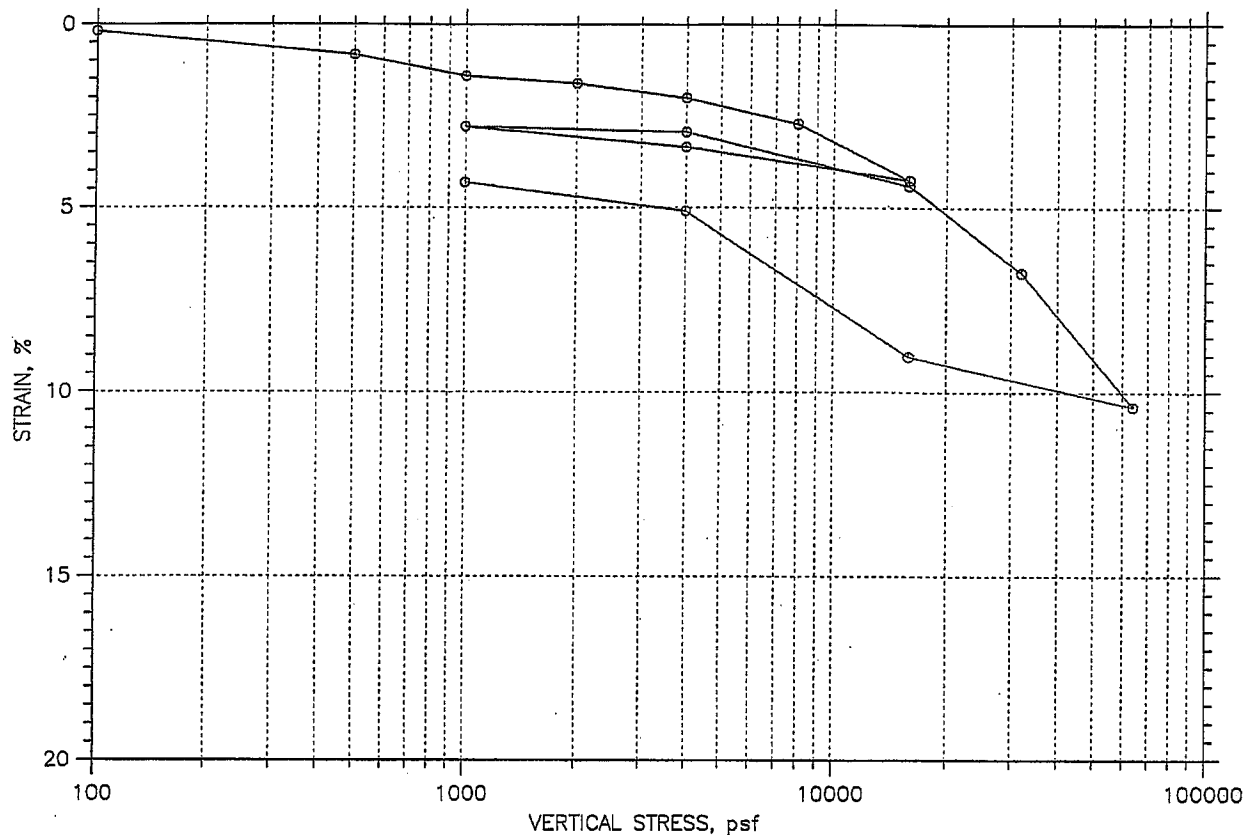
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                            |                                                                     |                          |                         |
|--------------------------------------------|---------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                  | Location: B-2302UD UD-11 | Project No.: 6468071777 |
|                                            | Boring No.: B-2302UD                                                | Tested By: BM            | Checked By: JW          |
|                                            | Sample No.: UD-11                                                   | Test Date: 4/07/08       | Depth: 69.5-71.5'       |
|                                            | Test No.: 8576                                                      | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Light Gray Mottled Light Yellowish Brown Fat CLAY (CH) |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                |                          |                         |
|                                            |                                                                     |                          | Cr= 0.025               |

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# CONSOLIDATION TEST DATA SUMMARY REPORT

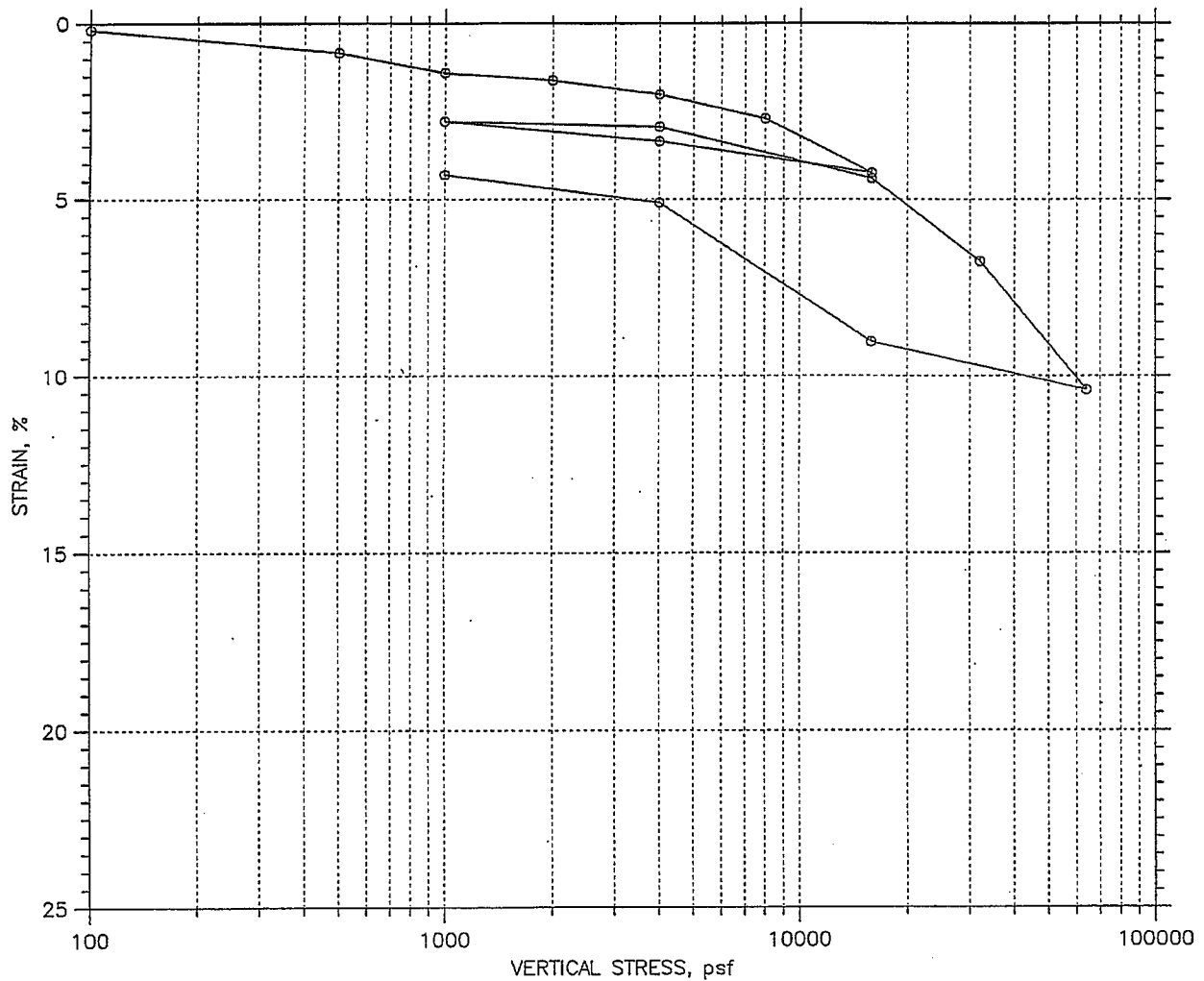


|                                |                                                                        |                          |                         |
|--------------------------------|------------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                     | Location: B-2304UD UD-7  | Project No.: 6468071777 |
|                                | Boring No.: B-2304UD                                                   | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-7                                                       | Test Date: 2/27/08       | Depth: 73.5-75.5'       |
|                                | Test No.: 8349                                                         | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Mottled Brownish Yellow and Pale Yellow Elastic SILT (MH) |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                   |                          | Cr= 0.028               |

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# CONSOLIDATION TEST DATA SUMMARY REPORT



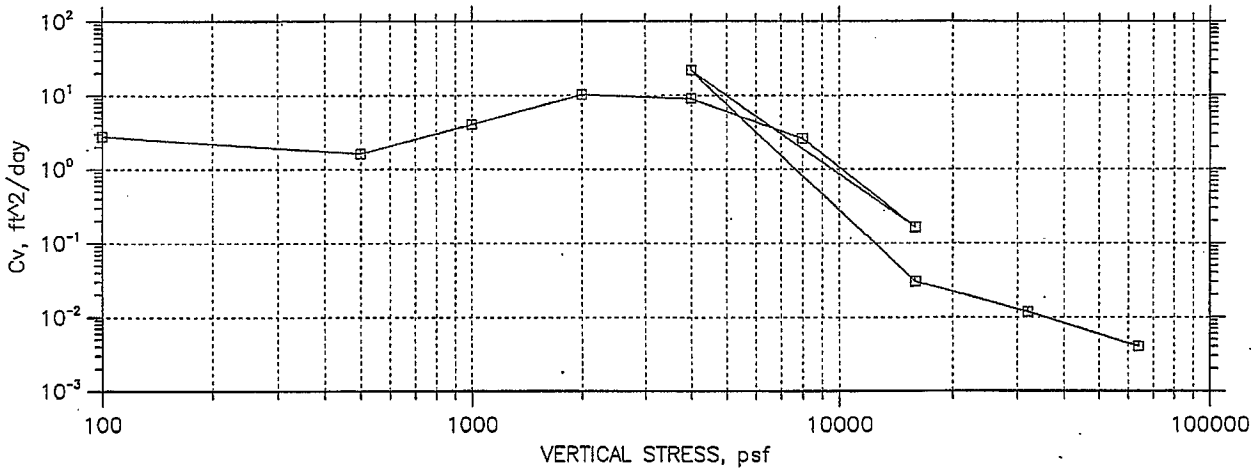
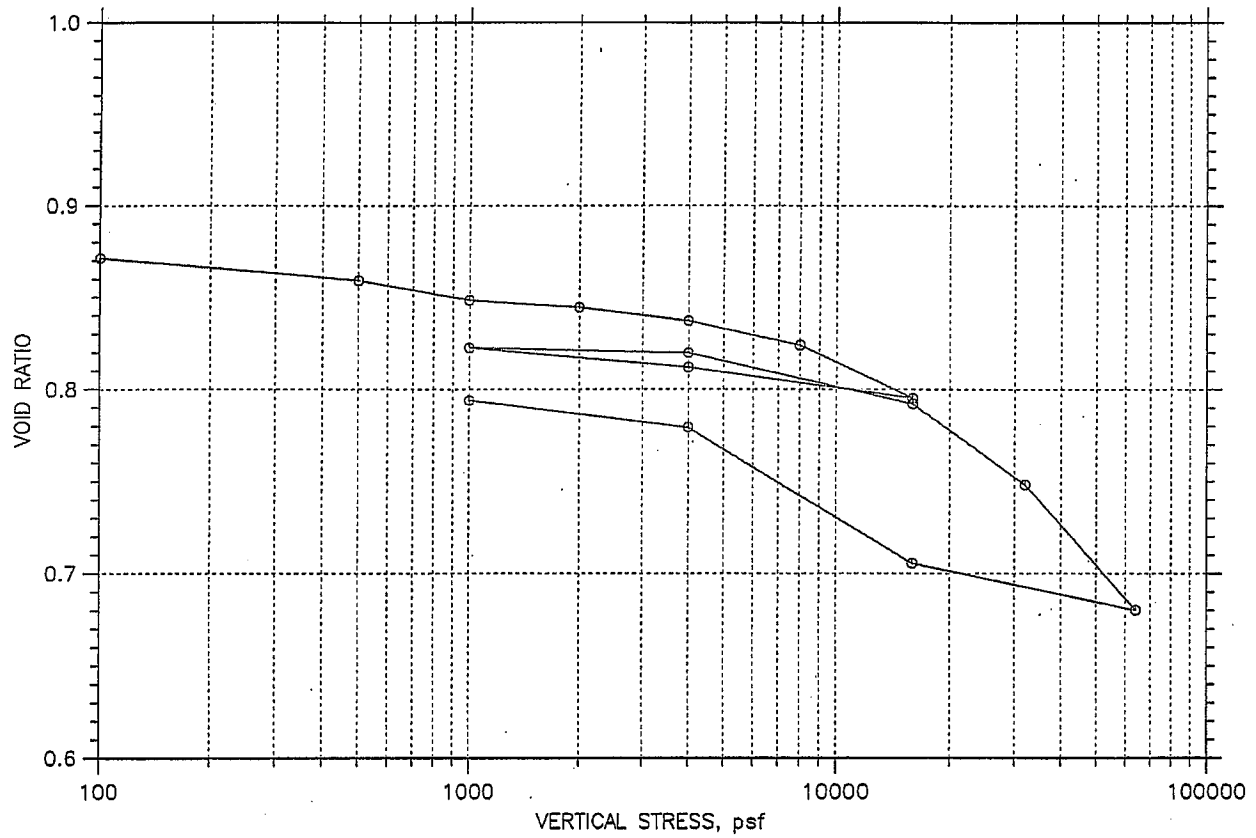
|                                         |        |                   |          | Before Test | After Test |
|-----------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 7800 psf           |        |                   |          | 29.83       | 28.40      |
| Preconsolidation Pressure: 1.8e+004 psf |        |                   |          | 92.56       | 96.74      |
| Compression Index: 0.226                |        |                   |          | 94.78       | 99.43      |
| Diameter: 2.498 in                      |        | Height: 0.9989 in |          | 0.87        | 0.79       |
| LL: 69                                  | PL: 34 | PI: 35            | GS: 2.78 |             |            |

|                                            |                                                                        |                          |                         |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                     | Location: B-2304UD UD-7  | Project No.: 6468071777 |
|                                            | Boring No.: B-2304UD                                                   | Tested By: BM            | Checked By: HJ          |
|                                            | Sample No.: UD-7                                                       | Test Date: 2/27/08       | Depth: 73.5-75.5'       |
|                                            | Test No.: 8349                                                         | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Mottled Brownish Yellow and Pale Yellow Elastic SILT (MH) |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                   |                          | Cr= 0.028               |

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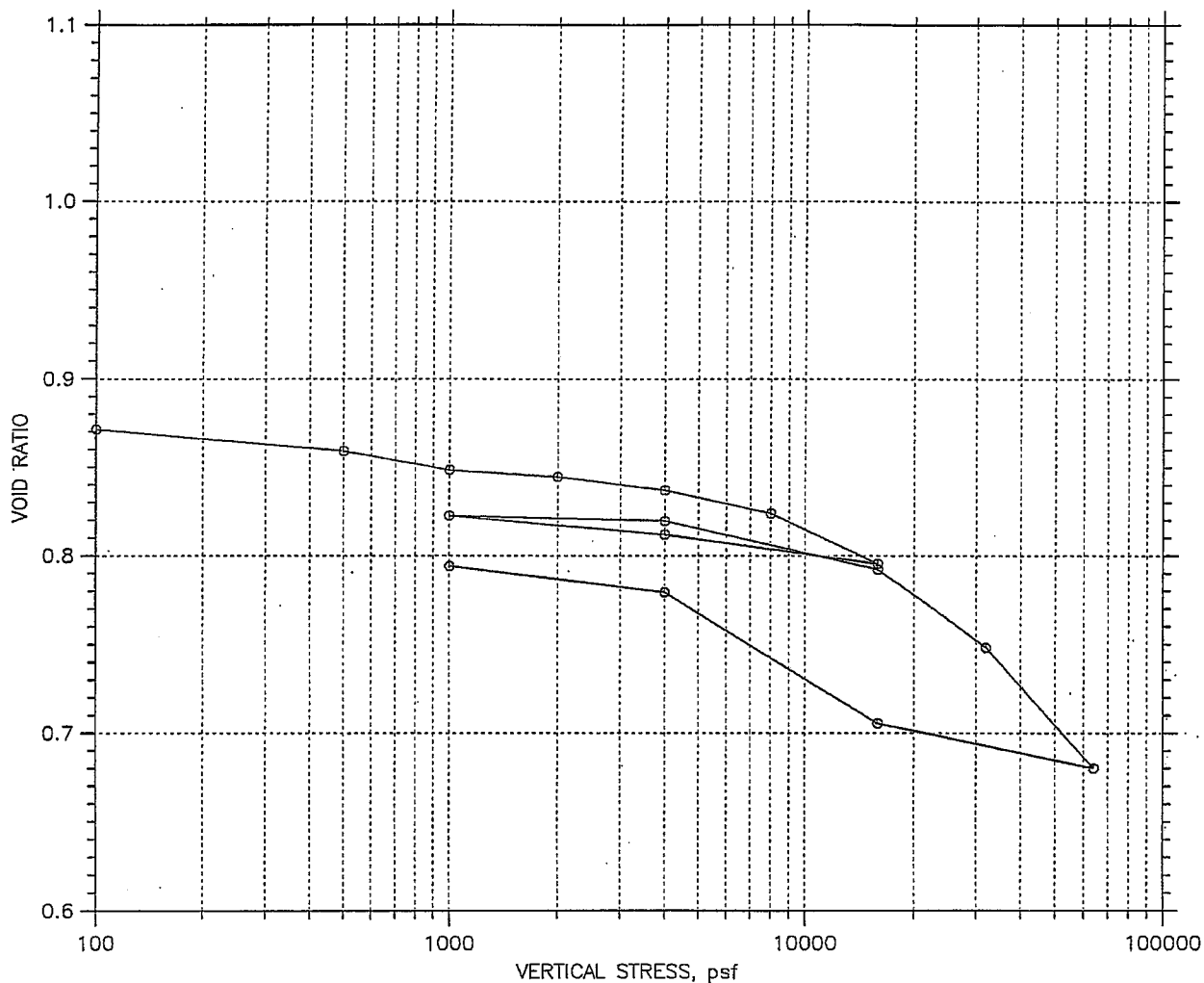
# CONSOLIDATION TEST DATA SUMMARY REPORT



|  |                                                                        |                          |                         |
|--|------------------------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                                     | Location: B-2304UD UD-7  | Project No.: 6468071777 |
|  | Boring No.: B-2304UD                                                   | Tested By: BM            | Checked By: HJ          |
|  | Sample No.: UD-7                                                       | Test Date: 2/27/08       | Depth: 73.5-75.5'       |
|  | Test No.: 8349                                                         | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Mottled Brownish Yellow and Pale Yellow Elastic SILT (MH) |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                   |                          |                         |
|  |                                                                        |                          | Cr= 0.028               |

Mon, 14-APR-2008 13:52:27

# CONSOLIDATION TEST DATA SUMMARY REPORT

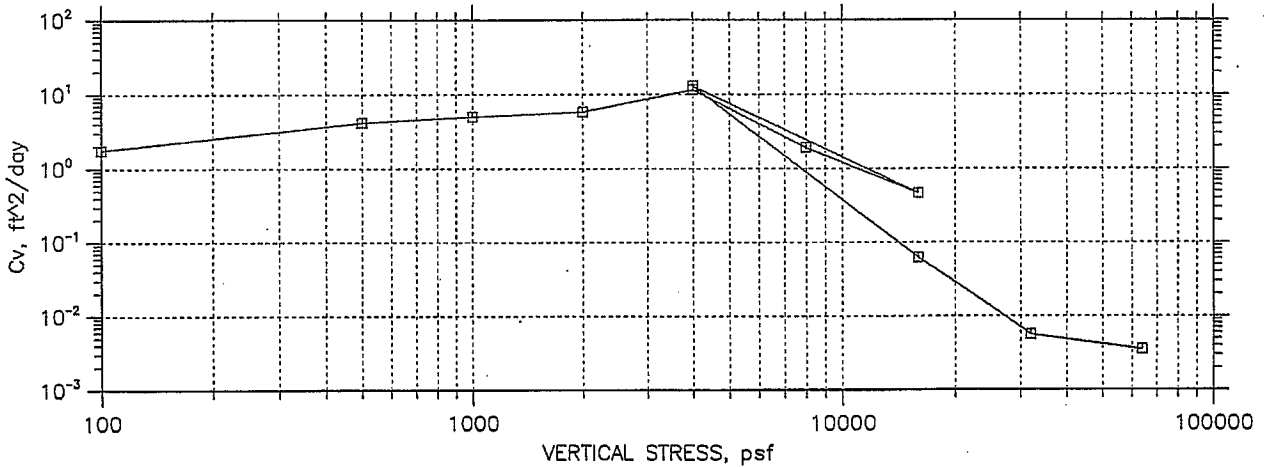
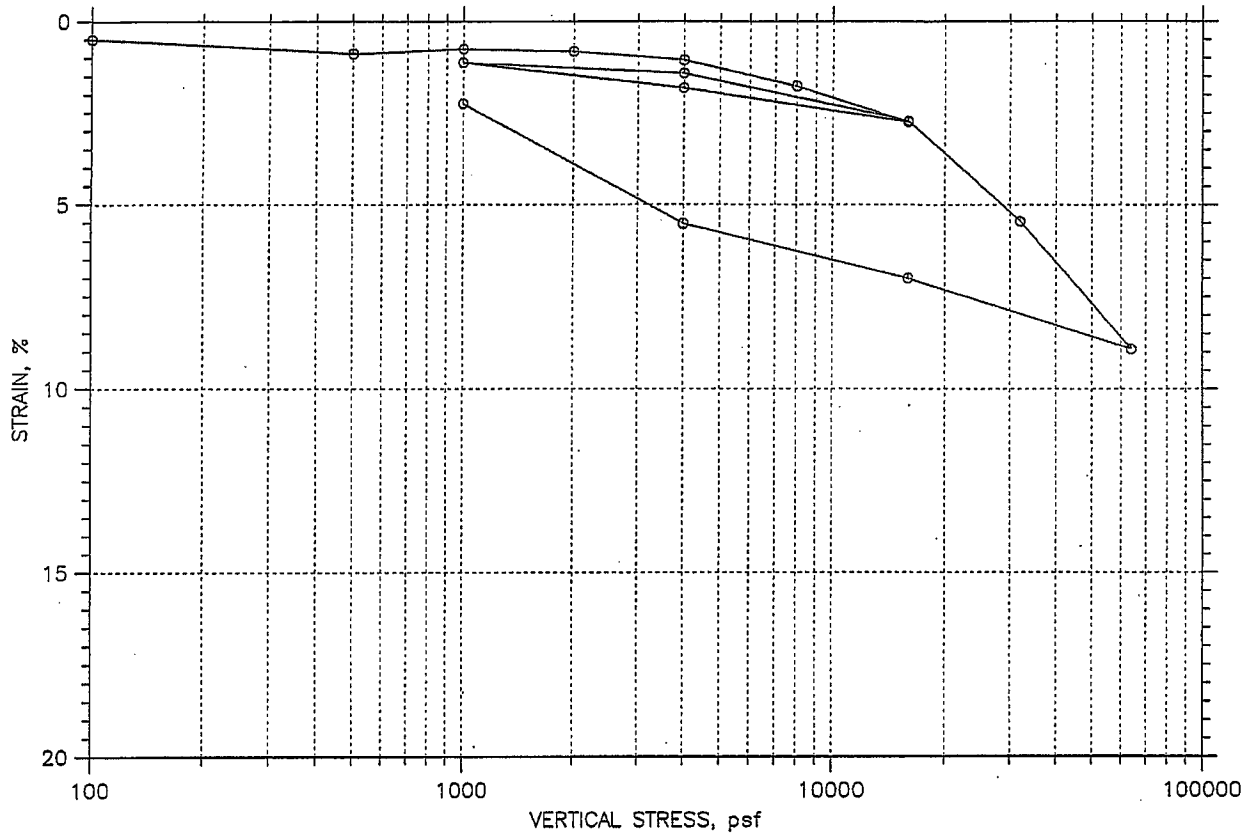


|                                         |        |                   |          | Before Test | After Test |
|-----------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 7800 psf           |        |                   |          | 29.83       | 28.40      |
| Preconsolidation Pressure: 1.8e+004 psf |        |                   |          | 92.56       | 96.74      |
| Compression Index: 0.226                |        |                   |          | 94.78       | 99.43      |
| Diameter: 2.498 in                      |        | Height: 0.9989 in |          | 0.87        | 0.79       |
| LL: 69                                  | PL: 34 | PI: 35            | GS: 2.78 |             |            |

|  |                                                                        |  |                          |                         |
|--|------------------------------------------------------------------------|--|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                                     |  | Location: B-2304UD UD-7  | Project No.: 6468071777 |
|  | Boring No.: B-2304UD                                                   |  | Tested By: BM            | Checked By: HJ          |
|  | Sample No.: UD-7                                                       |  | Test Date: 2/27/08       | Depth: 73.5-75.5'       |
|  | Test No.: 8349                                                         |  | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Mottled Brownish Yellow and Pale Yellow Elastic SILT (MH) |  |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 Cr= 0.028         |  |                          |                         |

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# CONSOLIDATION TEST DATA SUMMARY REPORT

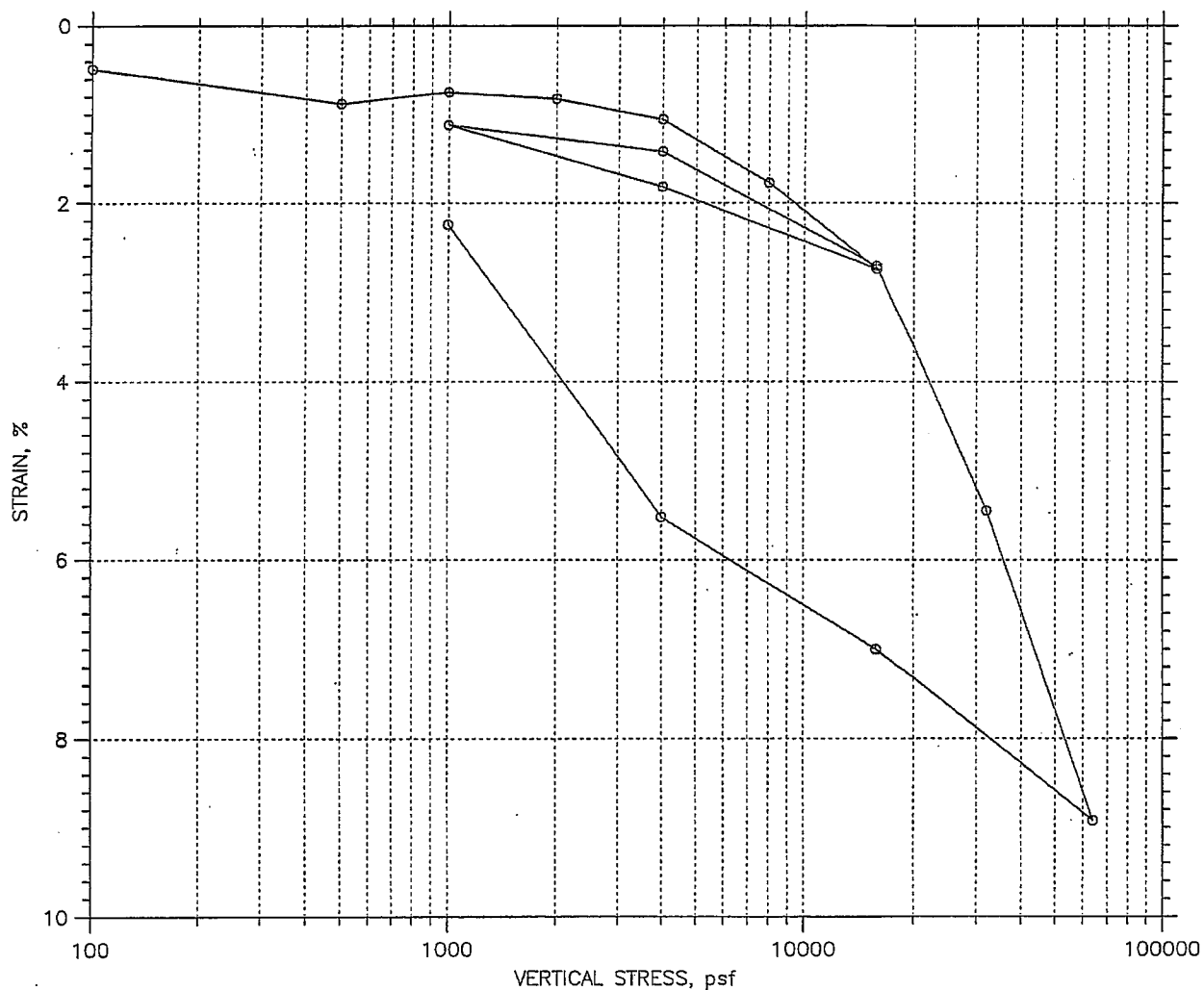


|                                                                                     |                                                                     |                          |                         |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                                  | Location: B-2304UD UD-9  | Project No.: 6468071777 |
|                                                                                     | Boring No.: B-2304UD                                                | Tested By: BM            | Checked By: HJ          |
|                                                                                     | Sample No.: UD-9                                                    | Test Date: 2/27/08       | Depth: 98.5-101.0'      |
|                                                                                     | Test No.: 8350                                                      | Sample Type: Undisturbed | Elevation: N/A          |
|                                                                                     | Description: Mottled Pale Yellow and Yellow Fat CLAY with Sand (CH) |                          |                         |
|                                                                                     | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                |                          | Cr= 0.027               |

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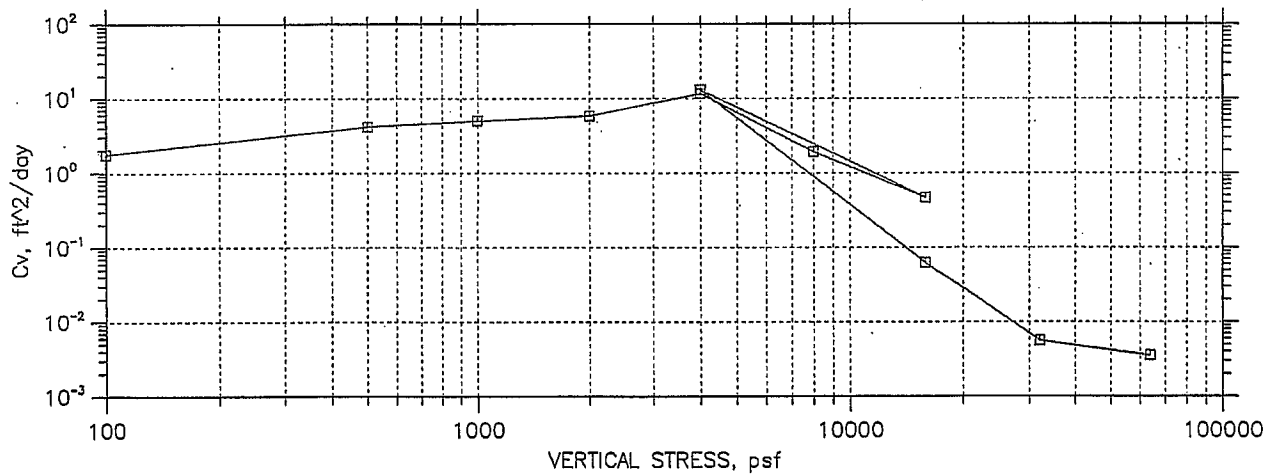
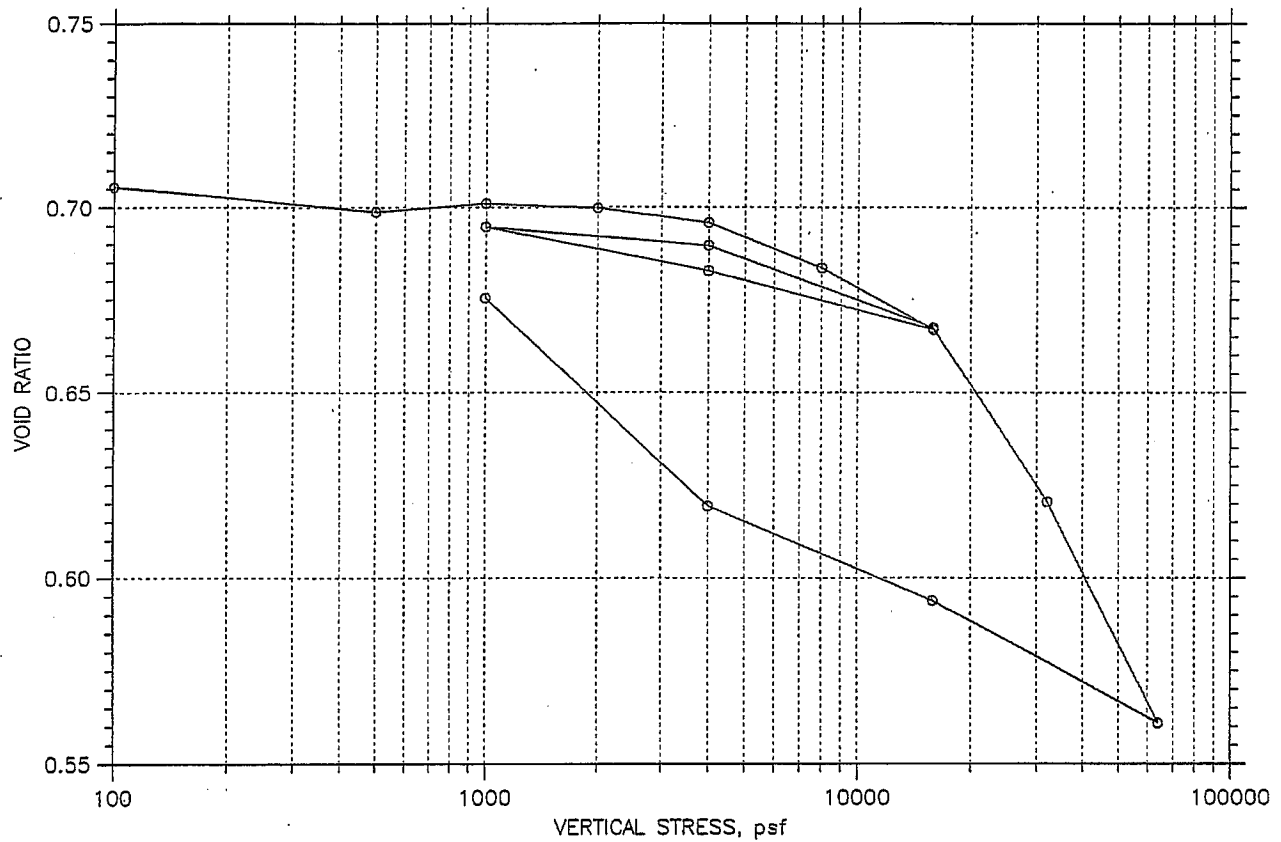
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                          |                  | Before Test          | After Test |
|------------------------------------------|------------------|----------------------|------------|
| Overburden Pressure: 9400 psf            |                  | Water Content, %     | 25.77      |
| Preconsolidation Pressure: 1.77e+004 psf |                  | Dry Unit Weight, pcf | 99.8       |
| Compression Index: 0.196                 |                  | Saturation, %        | 98.91      |
| Diameter: 2.499 in                       | Height: 1.001 in | Void Ratio           | 0.71       |
| LL: 62                                   | PL: 25           |                      | 0.68       |
| PI: 37                                   | GS: 2.74         |                      |            |

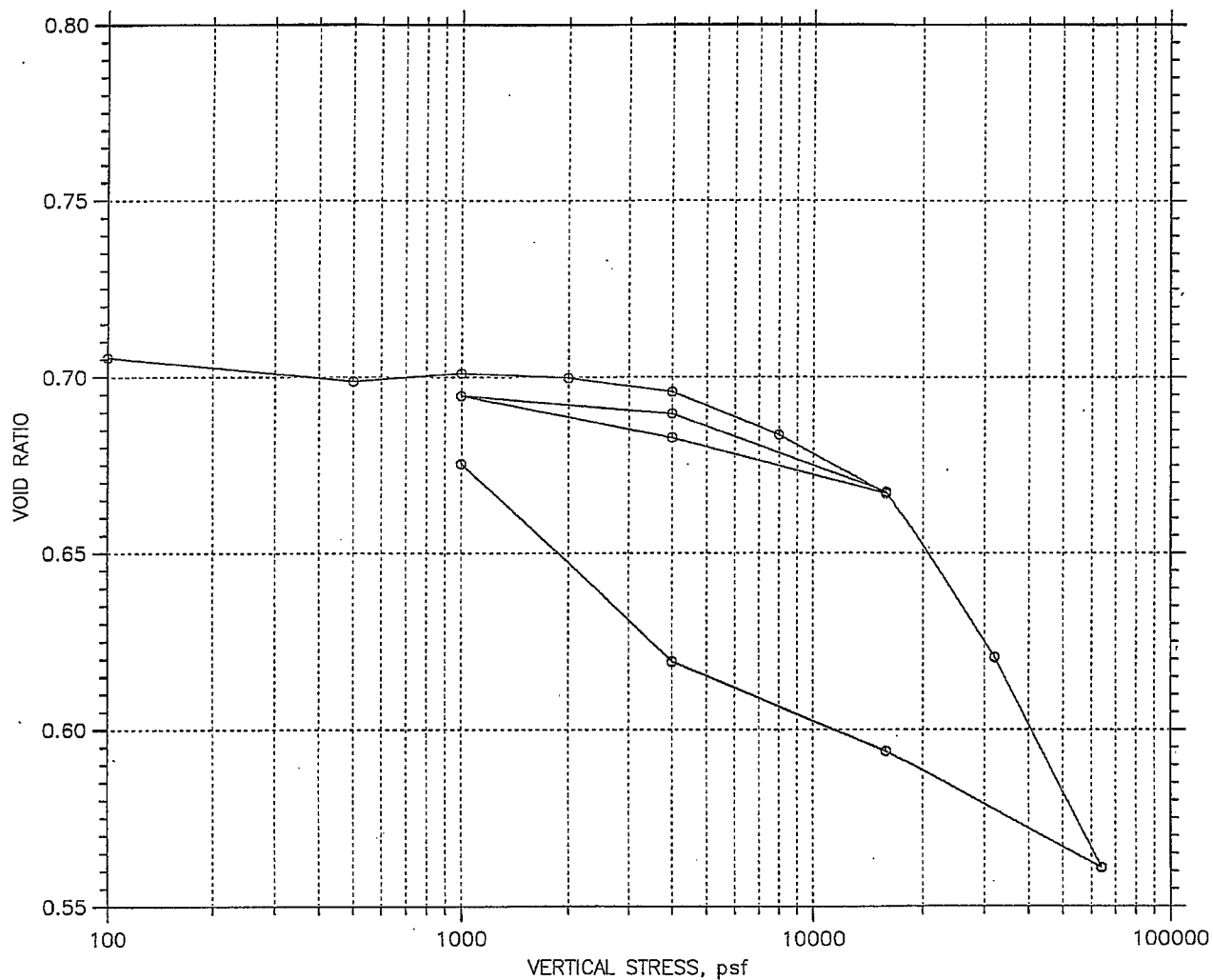
|                                            |                                                                     |                          |                         |
|--------------------------------------------|---------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                  | Location: B-2304UD UD-9  | Project No.: 6468071777 |
|                                            | Boring No.: B-2304UD                                                | Tested By: BM            | Checked By: HJ          |
|                                            | Sample No.: UD-9                                                    | Test Date: 2/27/08       | Depth: 98.5-101.0'      |
|                                            | Test No.: 8350                                                      | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Mottled Pale Yellow and Yellow Fat CLAY with Sand (CH) |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                |                          | Cr= 0.027               |

# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                                     |                          |                         |
|--------------------------------|---------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                  | Location: B-2304UD UD-9  | Project No.: 6468071777 |
|                                | Boring No.: B-2304UD                                                | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-9                                                    | Test Date: 2/27/08       | Depth: 98.5-101.0'      |
|                                | Test No.: 8350                                                      | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Mottled Pale Yellow and Yellow Fat CLAY with Sand (CH) |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                |                          | Cr= 0.027               |

# CONSOLIDATION TEST DATA SUMMARY REPORT

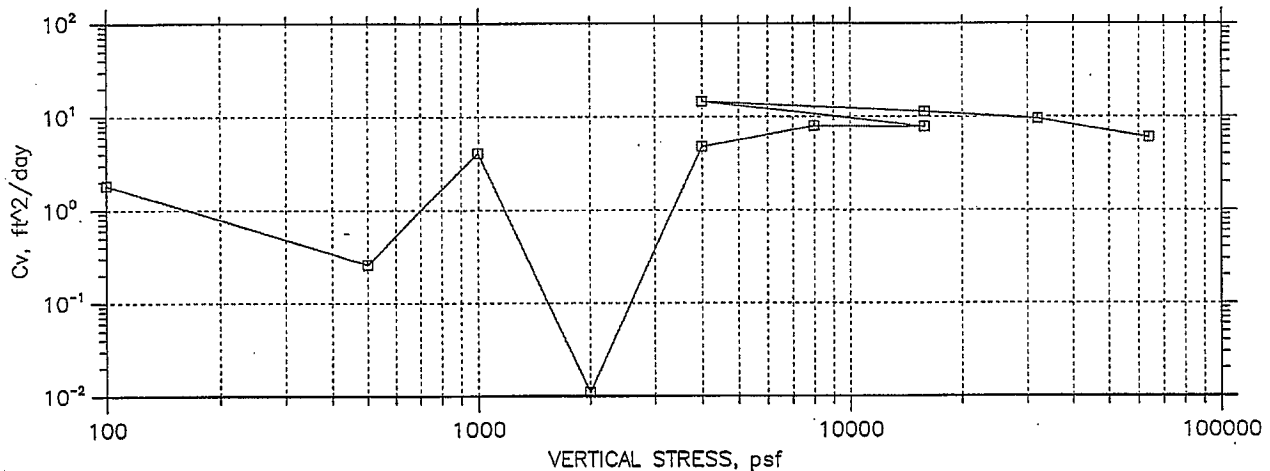
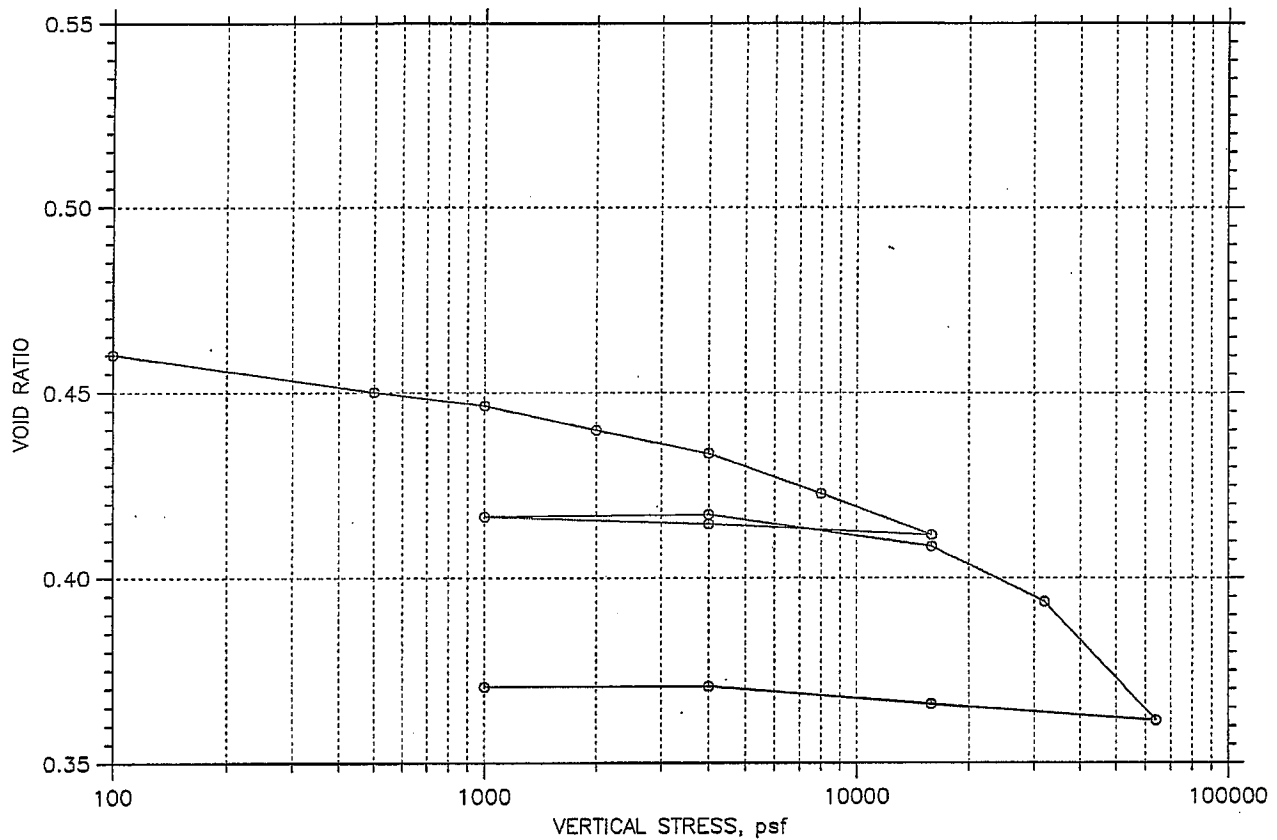


|                                          |        |                  |          | Before Test | After Test |
|------------------------------------------|--------|------------------|----------|-------------|------------|
| Overburden Pressure: 9400 psf            |        |                  |          | 25.77       | 24.46      |
| Preconsolidation Pressure: 1.77e+004 psf |        |                  |          | 99.8        | 102.1      |
| Compression Index: 0.196                 |        |                  |          | 98.91       | 99.24      |
| Diameter: 2.499 in                       |        | Height: 1.001 in |          | 0.71        | 0.68       |
| LL: 62                                   | PL: 25 | PI: 37           | GS: 2.74 |             |            |

|                                                      |                                                                     |  |                          |                         |
|------------------------------------------------------|---------------------------------------------------------------------|--|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria                                  |  | Location: B-2304UD UD-9  | Project No.: 6468071777 |
|                                                      | Boring No.: B-2304UD                                                |  | Tested By: BM            | Checked By: HJ          |
|                                                      | Sample No.: UD-9                                                    |  | Test Date: 2/27/08       | Depth: 98.5-101.0'      |
|                                                      | Test No.: 8350                                                      |  | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Mottled Pale Yellow and Yellow Fat CLAY with Sand (CH) |  |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                                                     |  |                          | Cr= 0.027               |

Mon, 14-APR-2008 13:53:50

# CONSOLIDATION TEST DATA SUMMARY REPORT

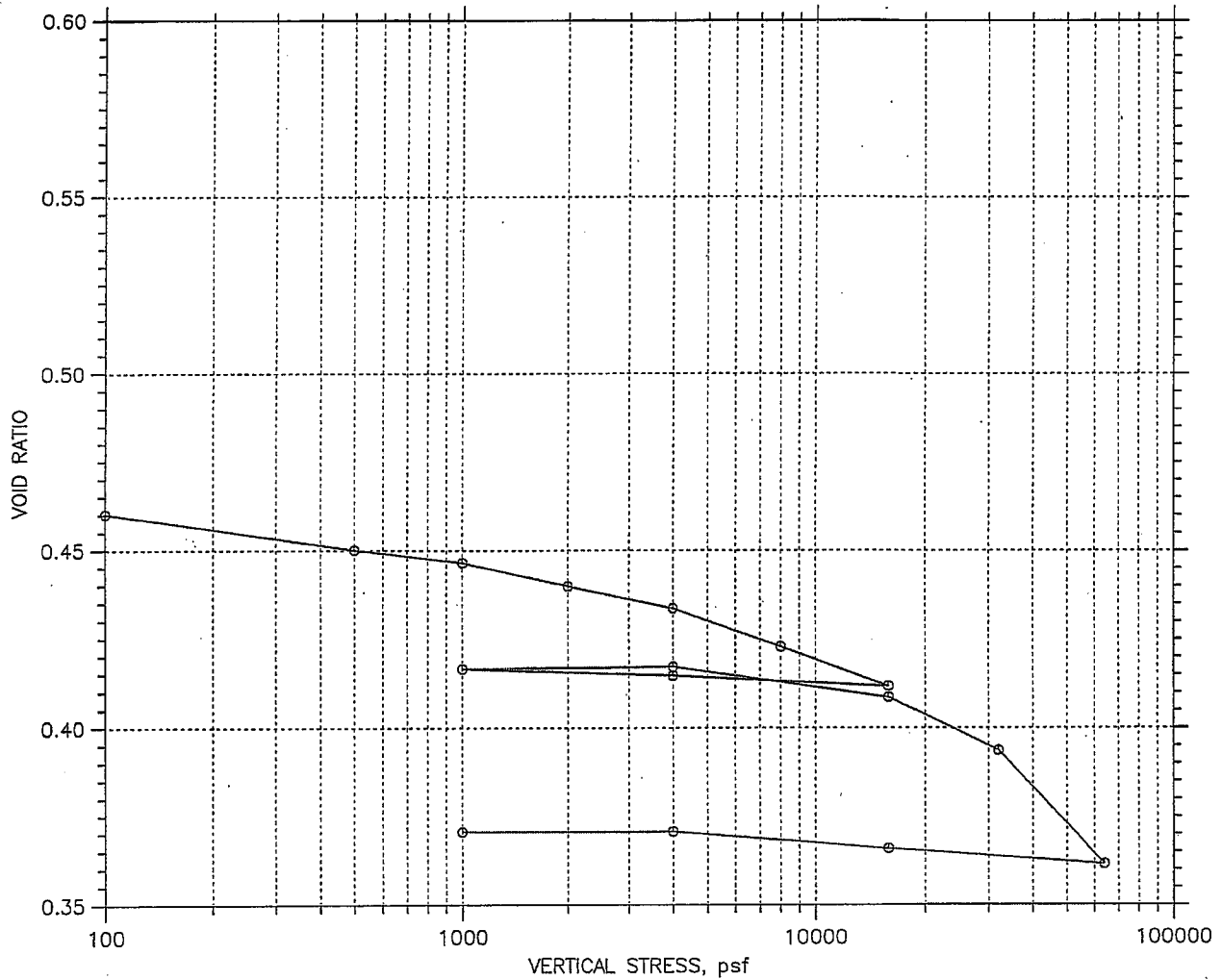


|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2319UD UD-2  | Project No.: 6468071777 |
|                                | Boring No.: B-2319UD                                 | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-2                                     | Test Date: 2/26/08       | Depth: 5.5-7.5'         |
|                                | Test No.: 8352                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Grayish Brown Clayey SAND (SC)          |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.003               |

Mon, 14-APR-2008 14:38:07

KAW 4.15.08

# CONSOLIDATION TEST DATA SUMMARY REPORT



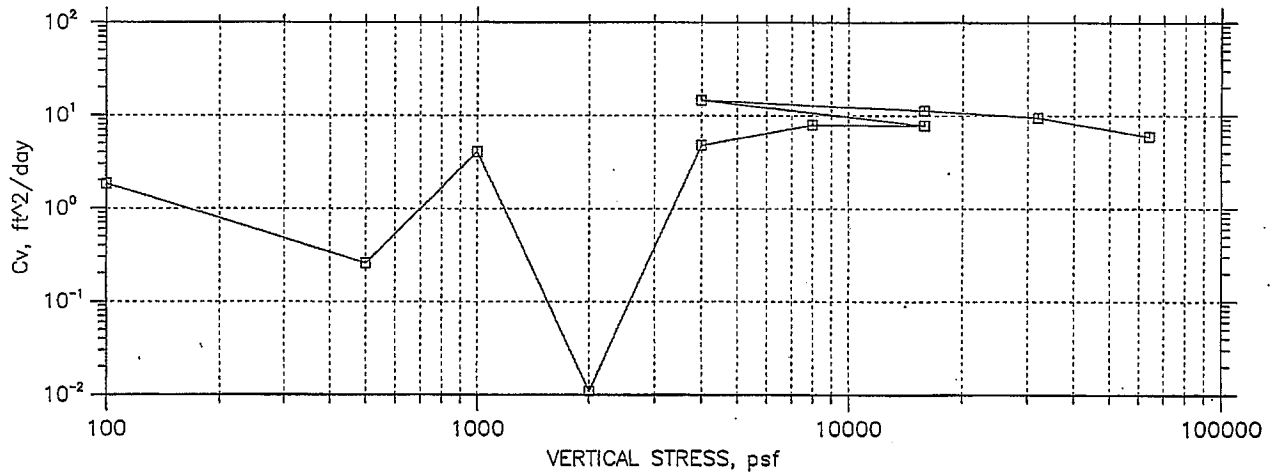
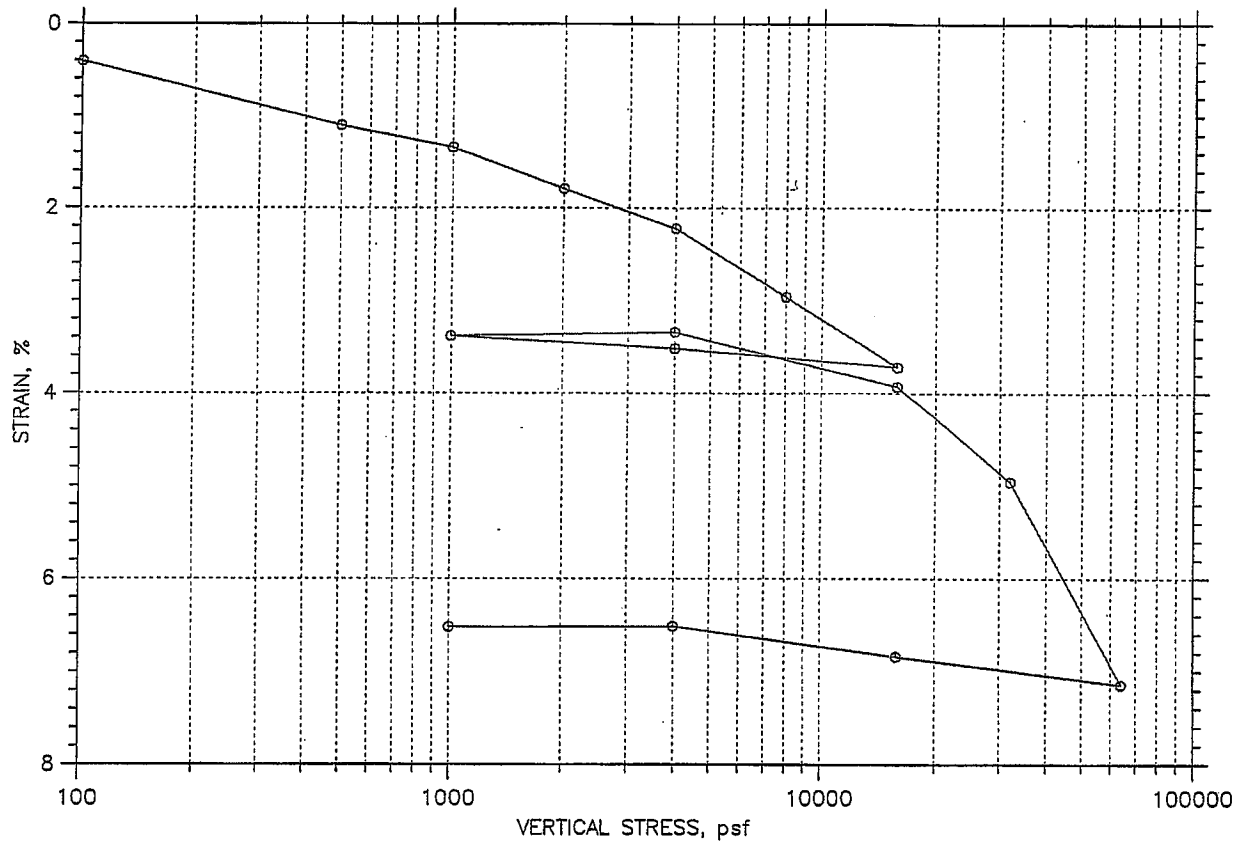
|                                         |                  |                      |          | Before Test | After Test |
|-----------------------------------------|------------------|----------------------|----------|-------------|------------|
| Overburden Pressure: 800 psf            |                  | Water Content, %     |          | 13.69       | 12.70      |
| Preconsolidation Pressure: 2.6e+004 psf |                  | Dry Unit Weight, pcf |          | 116.2       | 124.3      |
| Compression Index: 0.11                 |                  | Saturation, %        |          | 80.16       | 93.54      |
| Diameter: 2.5 in                        | Height: 1.003 in | Void Ratio           |          | 0.47        | 0.37       |
| LL: 37                                  | PL: 16           | PI: 21               | GS: 2.73 |             |            |

|                                                      |                                             |                          |                         |
|------------------------------------------------------|---------------------------------------------|--------------------------|-------------------------|
| MACTEC                                               | Project: Exelon Texas COL Victoria          | Location: B-2319UD UD-2  | Project No.: 6468071777 |
|                                                      | Boring No.: B-2319UD                        | Tested By: BM            | Checked By: HJ          |
|                                                      | Sample No.: UD-2                            | Test Date: 2/26/08       | Depth: 5.5-7.5'         |
|                                                      | Test No.: 8352                              | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Grayish Brown Clayey SAND (SC) |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                             |                          | Cr= 0.003               |

Mon, 14-APR-2008 14:38:07

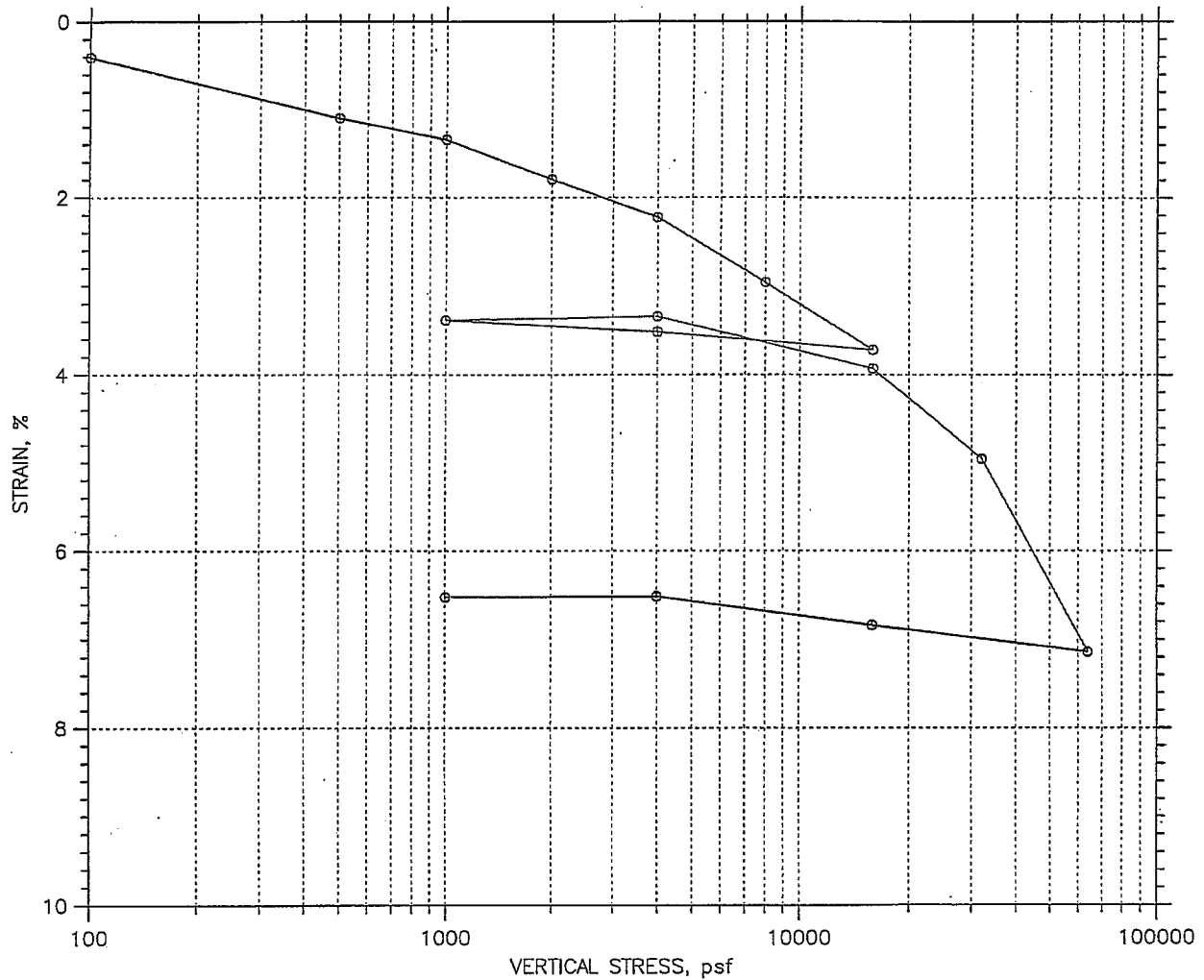


# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2319UD UD-2  | Project No.: 6468071777 |
|                                | Boring No.: B-2319UD                                 | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-2                                     | Test Date: 2/26/08       | Depth: 5.5-7.5'         |
|                                | Test No.: 8352                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Grayish Brown Clayey SAND (SC)          |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.003               |

# CONSOLIDATION TEST DATA SUMMARY REPORT

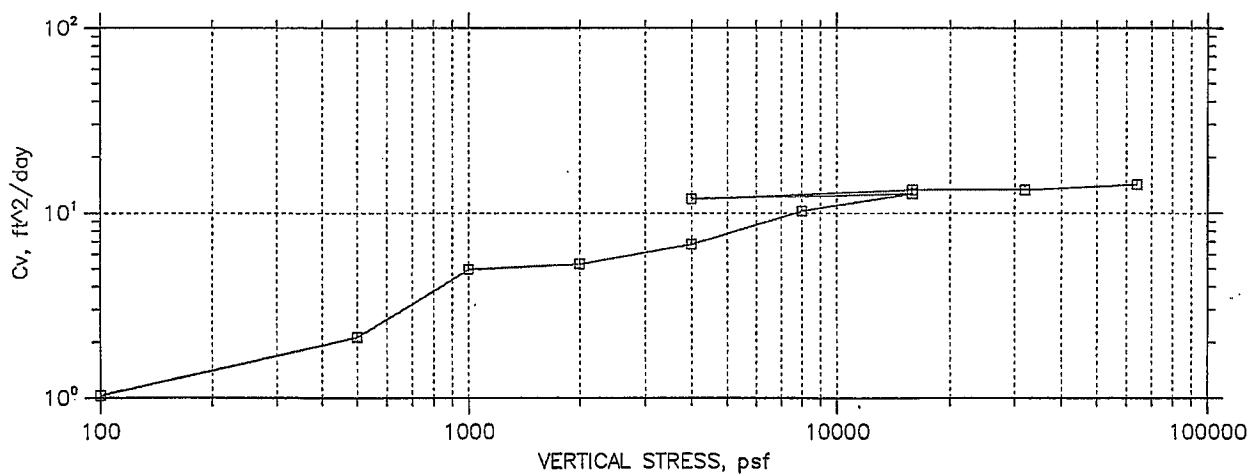
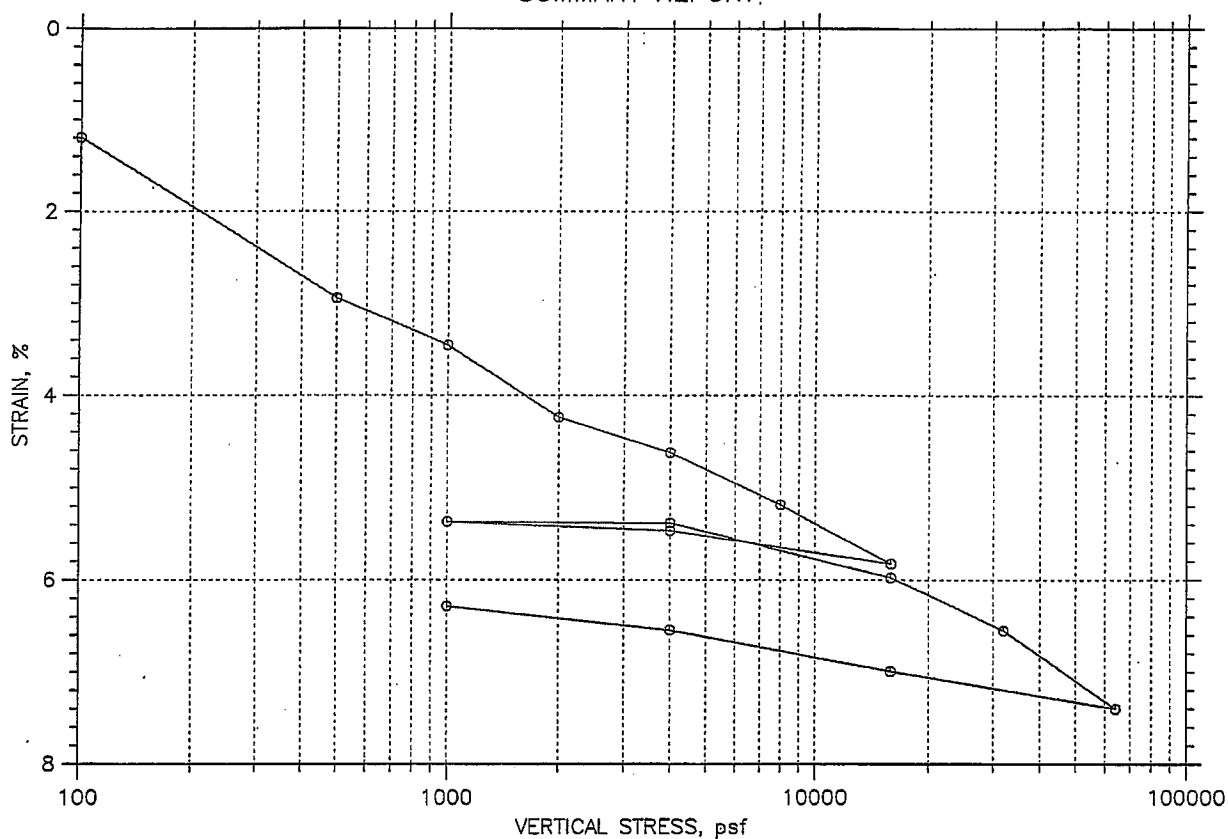


|                                         |                  | Before Test          | After Test |
|-----------------------------------------|------------------|----------------------|------------|
| Overburden Pressure: 800 psf            |                  | Water Content, %     | 13.69      |
| Preconsolidation Pressure: 2.6e+004 psf |                  | Dry Unit Weight, pcf | 124.3      |
| Compression Index: 0.11                 |                  | Saturation, %        | 93.54      |
| Diameter: 2.5 in                        | Height: 1.003 in | Void Ratio           |            |
| LL: 37                                  | PL: 16           | 0.47                 |            |
| PI: 21                                  | GS: 2.73         | 0.37                 |            |

|                                                      |                                             |                          |                         |
|------------------------------------------------------|---------------------------------------------|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria          | Location: B-2319UD UD-2  | Project No.: 6468071777 |
|                                                      | Boring No.: B-2319UD                        | Tested By: BM            | Checked By: HJ          |
|                                                      | Sample No.: UD-2                            | Test Date: 2/26/08       | Depth: 5.5-7.5'         |
|                                                      | Test No.: 8352                              | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Grayish Brown Clayey SAND (SC) |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                             |                          | Cr= 0.003               |

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# CONSOLIDATION TEST DATA SUMMARY REPORT

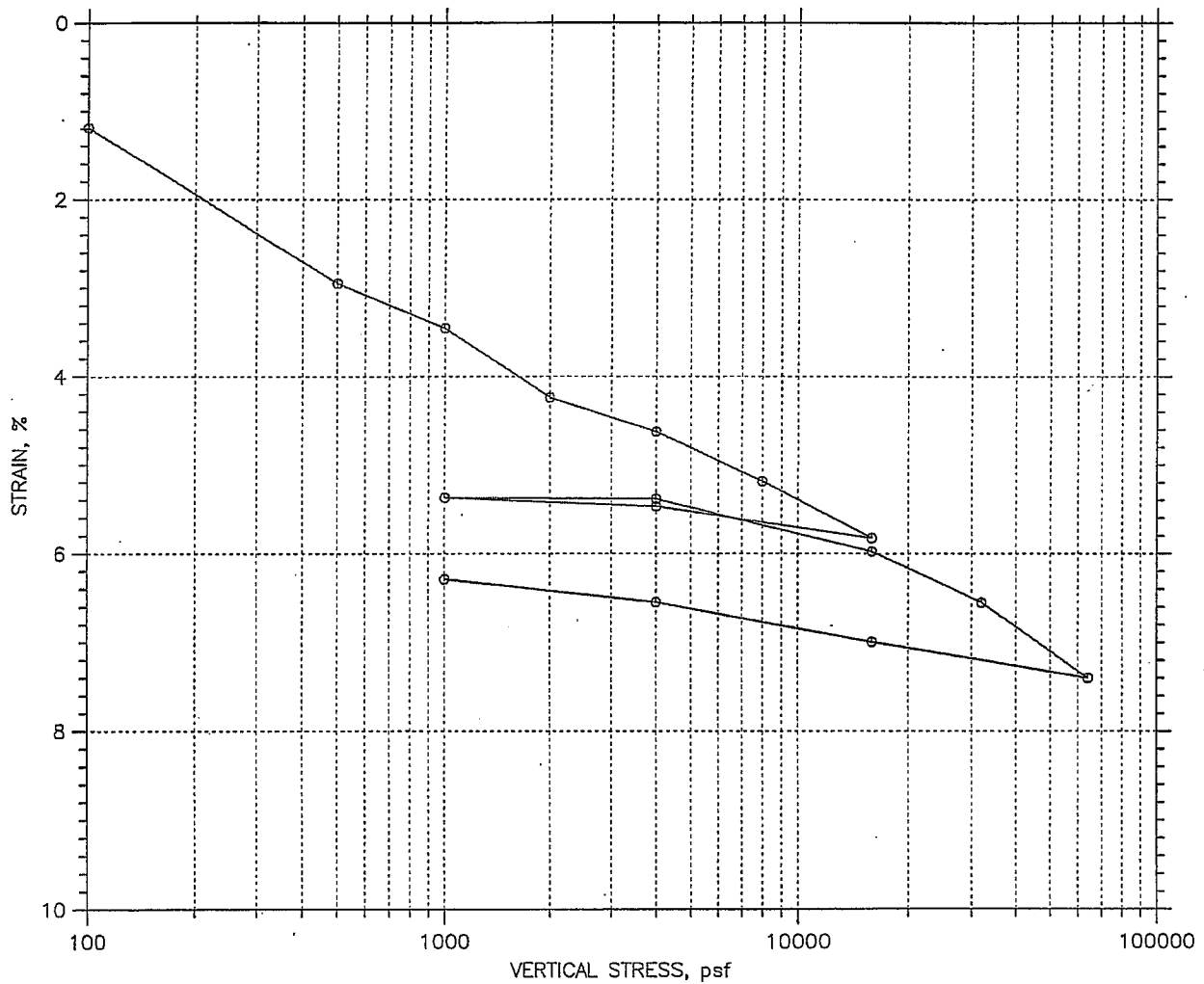


|                                                         |                                                              |                          |                         |
|---------------------------------------------------------|--------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div> <div></div> <div>MACTEC</div> </div> </div> | Project: Exelon Texas COL Victoria                           | Location: B-2319UD UD-8  | Project No.: 6468071777 |
|                                                         | Boring No.: B-2319UD                                         | Tested By: BM            | Checked By: HJ          |
|                                                         | Sample No.: UD-8                                             | Test Date: 2/27/08       | Depth: 75-77'           |
|                                                         | Test No.: 8356                                               | Sample Type: Undisturbed | Elevation: N/A          |
|                                                         | Description: Light Gray Poorly Graded SAND with Silt (SP-SM) |                          |                         |
|                                                         | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04         |                          |                         |
|                                                         | Cr= 0.010                                                    |                          |                         |

Mon, 14-APR-2008 13:56:04

KAW 4.15.08

# CONSOLIDATION TEST DATA SUMMARY REPORT

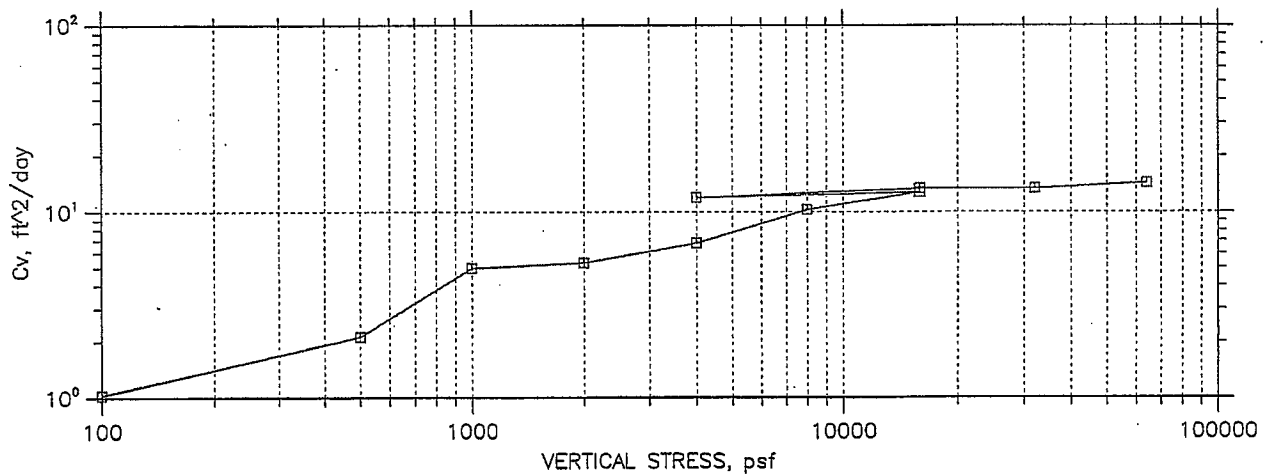
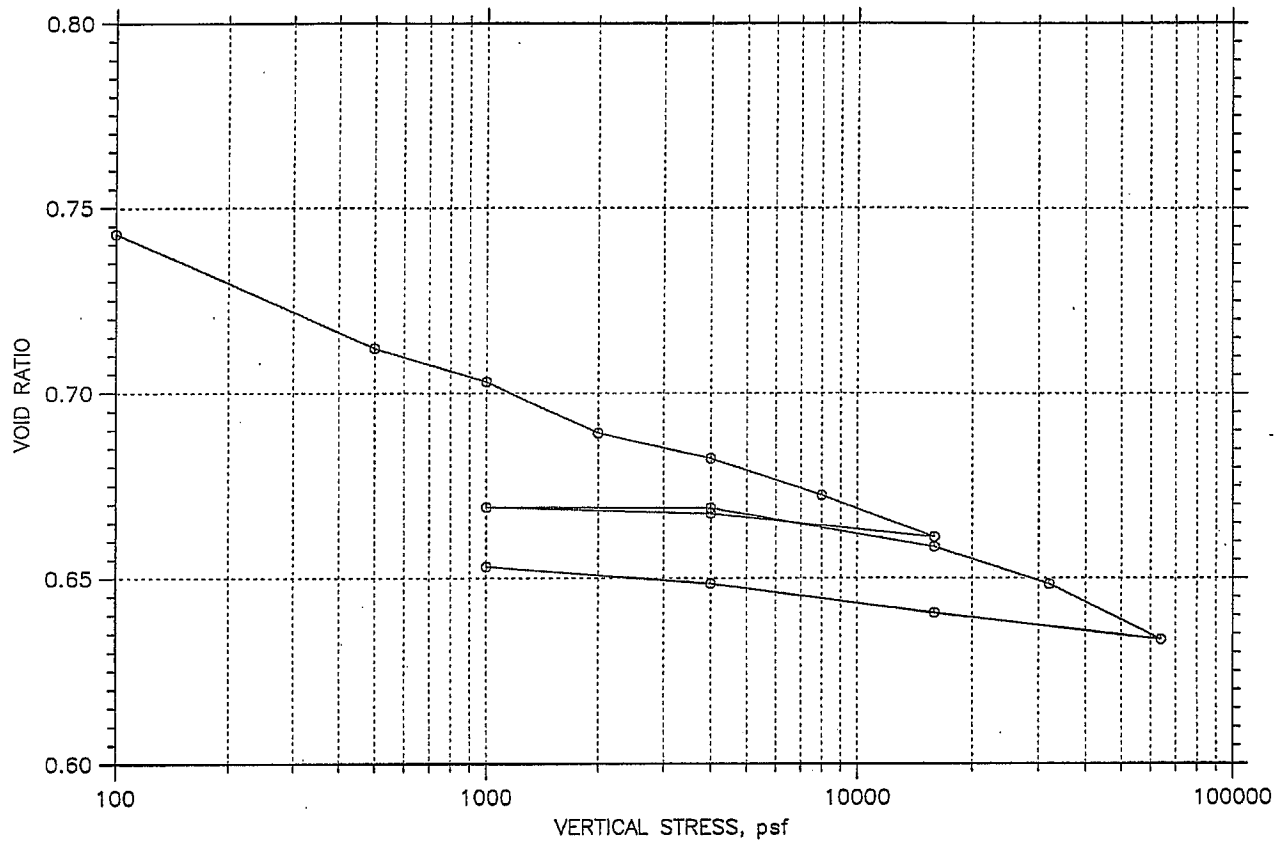


|                                          |        |                   |          | Before Test          | After Test |       |
|------------------------------------------|--------|-------------------|----------|----------------------|------------|-------|
| Overburden Pressure: 7900 psf            |        |                   |          | Water Content, %     | 25.28      | 23.84 |
| Preconsolidation Pressure: 1.79e+004 psf |        |                   |          | Dry Unit Weight, pcf | 96.62      | 103.1 |
| Compression Index: 0.05                  |        |                   |          | Saturation, %        | 90.33      | 99.66 |
| Diameter: 2.499 in                       |        | Height: 0.9954 in |          | Void Ratio           | 0.76       | 0.65  |
| LL: NP                                   | PL: NP | PI: NP            | GS: 2.73 |                      |            |       |

|                                                                                     |                                                              |  |                          |                                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------|--|--------------------------|------------------------------------------------------------------------------------------------------|
|  | Project: Exelon Texas COL Victoria                           |  | Location: B-2319UD UD-8  | Project No.: 6468071777                                                                              |
|                                                                                     | Boring No.: B-2319UD                                         |  | Tested By: BM            | Checked By: HJ  |
|                                                                                     | Sample No.: UD-8                                             |  | Test Date: 2/27/08       | Depth: 75-77'   |
|                                                                                     | Test No.: 8356                                               |  | Sample Type: Undisturbed | Elevation: N/A                                                                                       |
|                                                                                     | Description: Light Gray Poorly Graded SAND with Silt (SP-SM) |  |                          |                                                                                                      |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04                                |                                                              |  |                          | Cr= 0.010                                                                                            |

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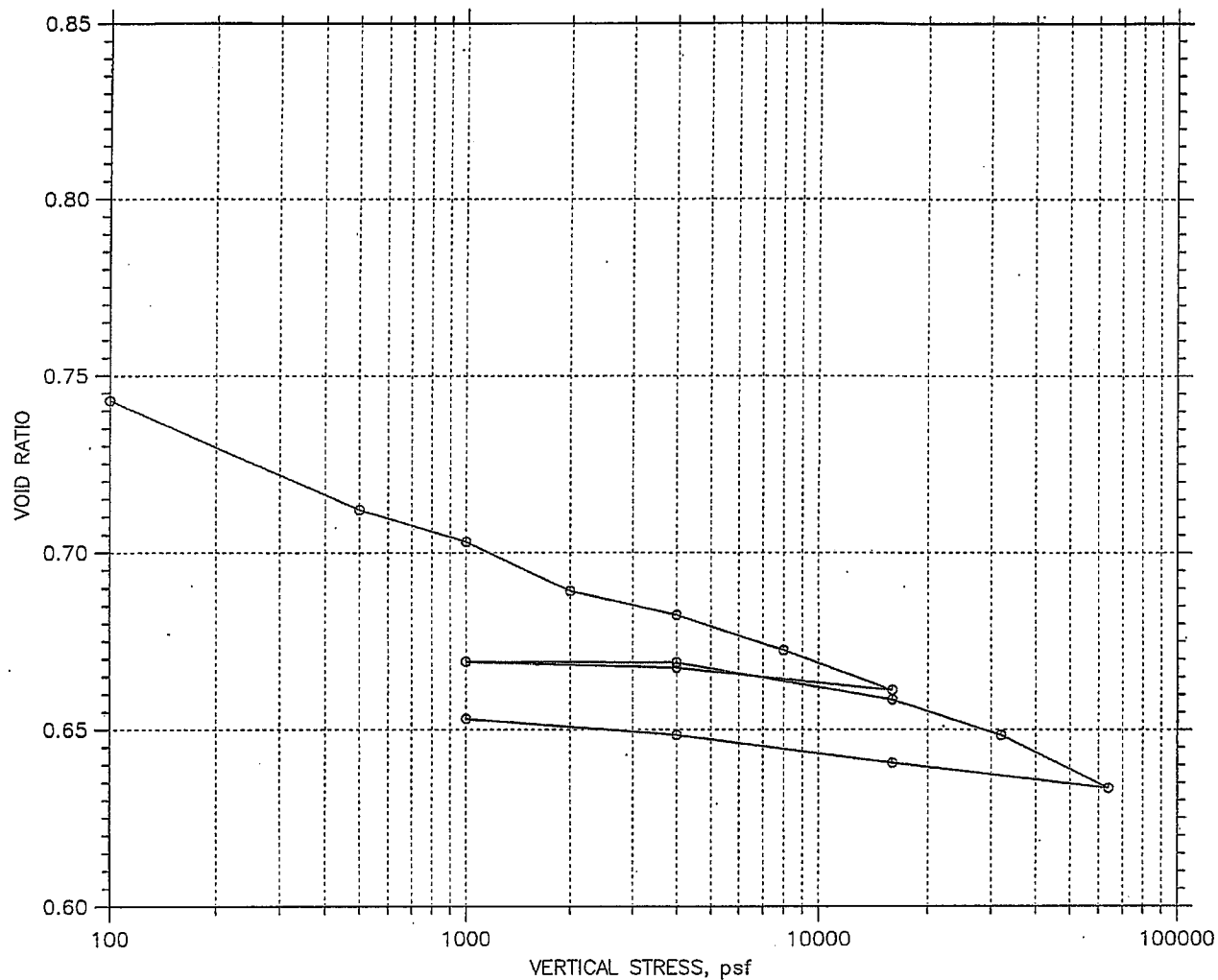
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                              |                          |                                                    |
|--------------------------------|--------------------------------------------------------------|--------------------------|----------------------------------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                           | Location: B-2319UD UD-8  | Project No.: 6468071777                            |
|                                | Boring No.: B-2319UD                                         | Tested By: BM            | Checked By: HJ <input checked="" type="checkbox"/> |
|                                | Sample No.: UD-8                                             | Test Date: 2/27/08       | Depth: 75-77' 4/14/08                              |
|                                | Test No.: 8356                                               | Sample Type: Undisturbed | Elevation: N/A                                     |
|                                | Description: Light Gray Poorly Graded SAND with Silt (SP-SM) |                          |                                                    |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04         |                          | Cr= 0.010                                          |

Mon, 14-APR-2008 13:55:54

# CONSOLIDATION TEST DATA SUMMARY REPORT

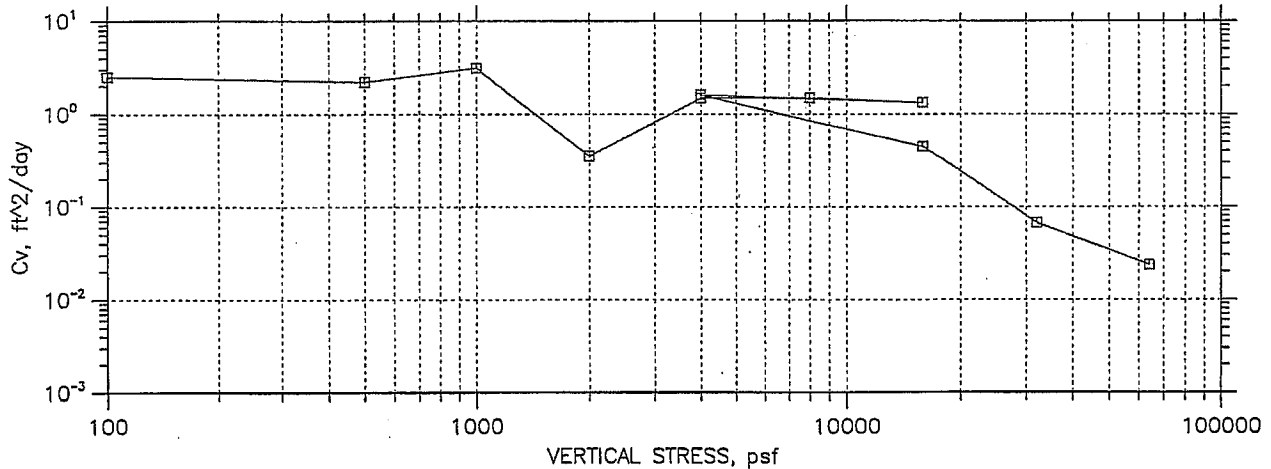
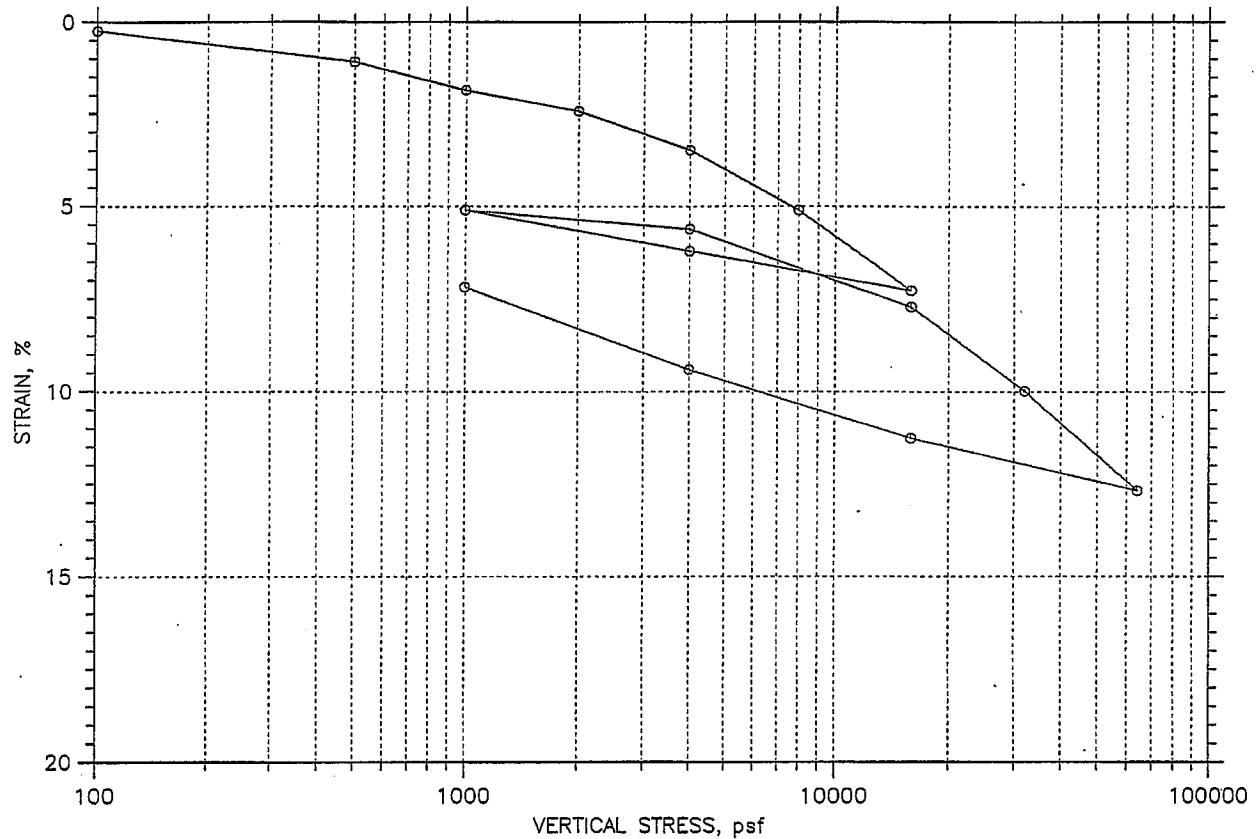


|                                          |                   |                      |          | Before Test | After Test |
|------------------------------------------|-------------------|----------------------|----------|-------------|------------|
| Overburden Pressure: 7900 psf            |                   | Water Content, %     |          | 25.28       | 23.84      |
| Preconsolidation Pressure: 1.79e+004 psf |                   | Dry Unit Weight, pcf |          | 96.62       | 103.1      |
| Compression Index: 0.05                  |                   | Saturation, %        |          | 90.33       | 99.66      |
| Diameter: 2.499 in                       | Height: 0.9954 in | Void Ratio           |          | 0.76        | 0.65       |
| LL: NP                                   | PL: NP            | PI: NP               | GS: 2.73 |             |            |

|  |                                                              |  |                          |                         |
|--|--------------------------------------------------------------|--|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                           |  | Location: B-2319UD UD-8  | Project No.: 6468071777 |
|  | Boring No.: B-2319UD                                         |  | Tested By: BM            | Checked By: HJ          |
|  | Sample No.: UD-8                                             |  | Test Date: 2/27/08       | Depth: 75-77'           |
|  | Test No.: 8356                                               |  | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Light Gray Poorly Graded SAND with Silt (SP-SM) |  |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04         |  |                          |                         |
|  |                                                              |  |                          | Cr= 0.010               |

Mon, 14-APR-2008 13:55:54

# CONSOLIDATION TEST DATA SUMMARY REPORT

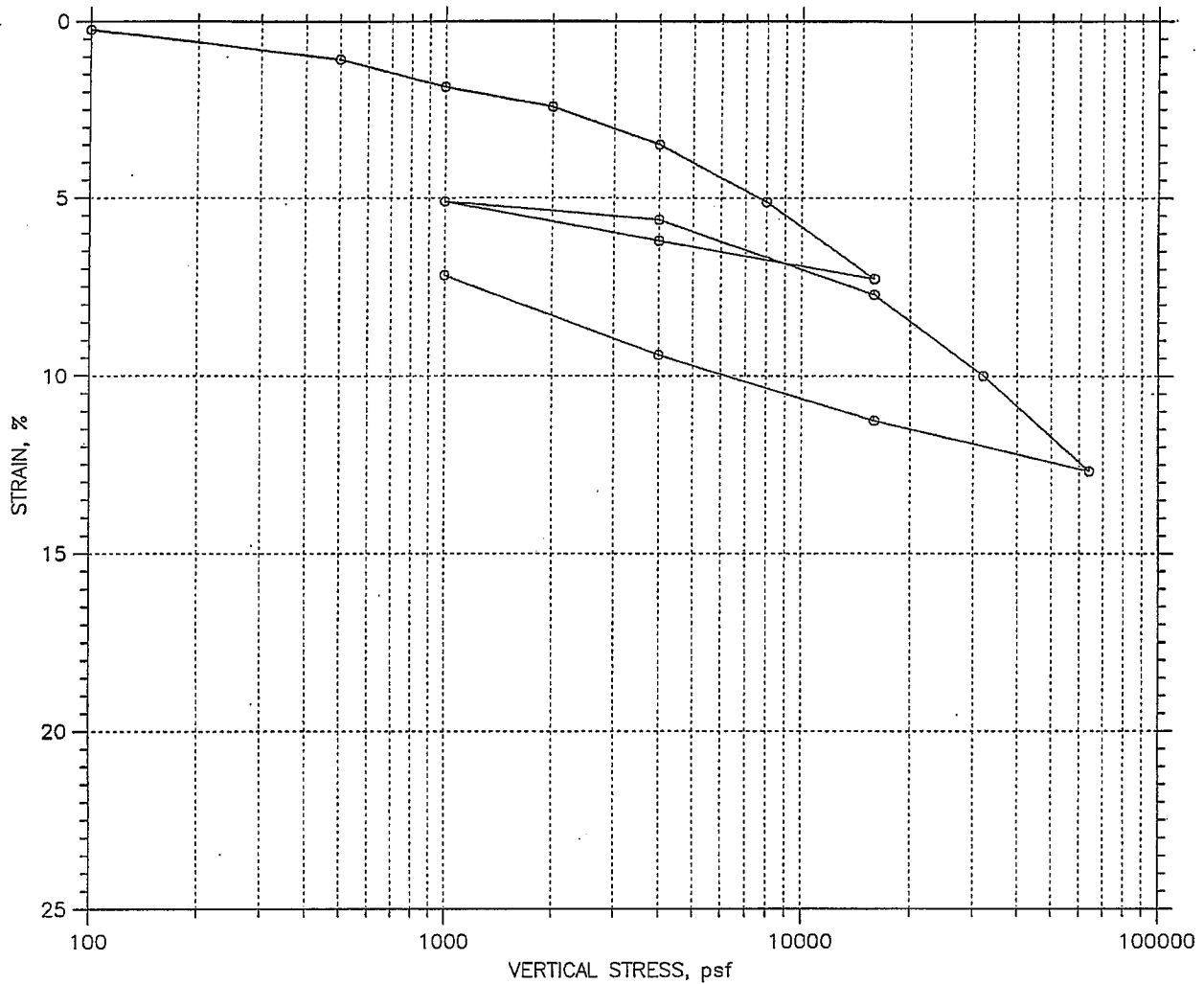


|                                |                                                                    |                          |                                  |
|--------------------------------|--------------------------------------------------------------------|--------------------------|----------------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                 | Location: B-2321UD UD-7  | Project No.: 6468071777          |
|                                | Boring No.: B-2321UD                                               | Tested By: BM            | Checked By: HJ <i>HJ</i>         |
|                                | Sample No.: UD-7                                                   | Test Date: 3/28/08       | Depth: 38.5-40.2' <i>41.4/03</i> |
|                                | Test No.: 8358                                                     | Sample Type: Undisturbed | Elevation: N/A                   |
|                                | Description: Very Pale Brown Mottled Brownish Yellow Fat Clay (CH) |                          |                                  |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04               |                          | Cr= 0.032                        |

Mon, 14-APR-2008 13:57:25

KAW 4.15.08

# CONSOLIDATION TEST DATA SUMMARY REPORT



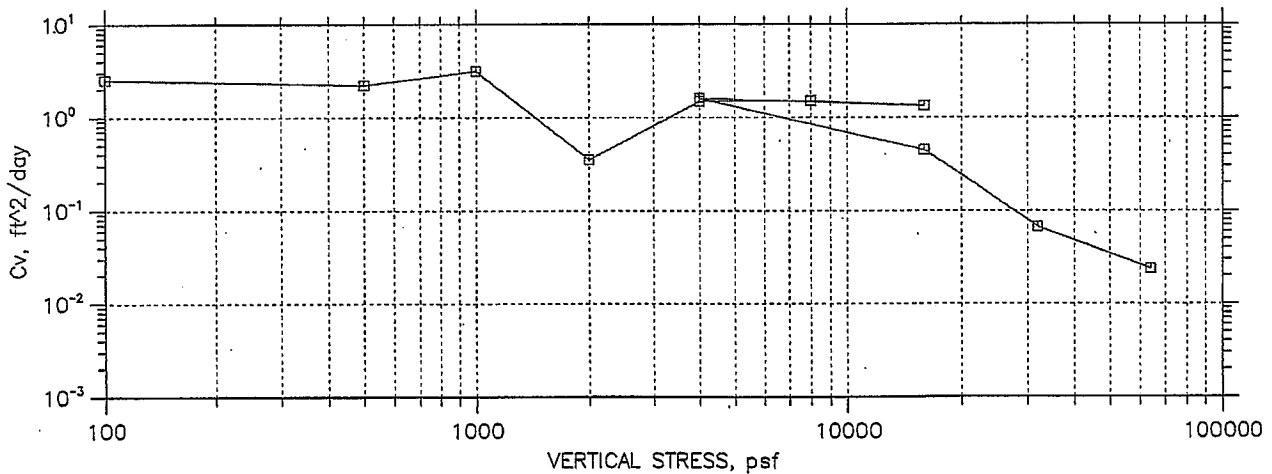
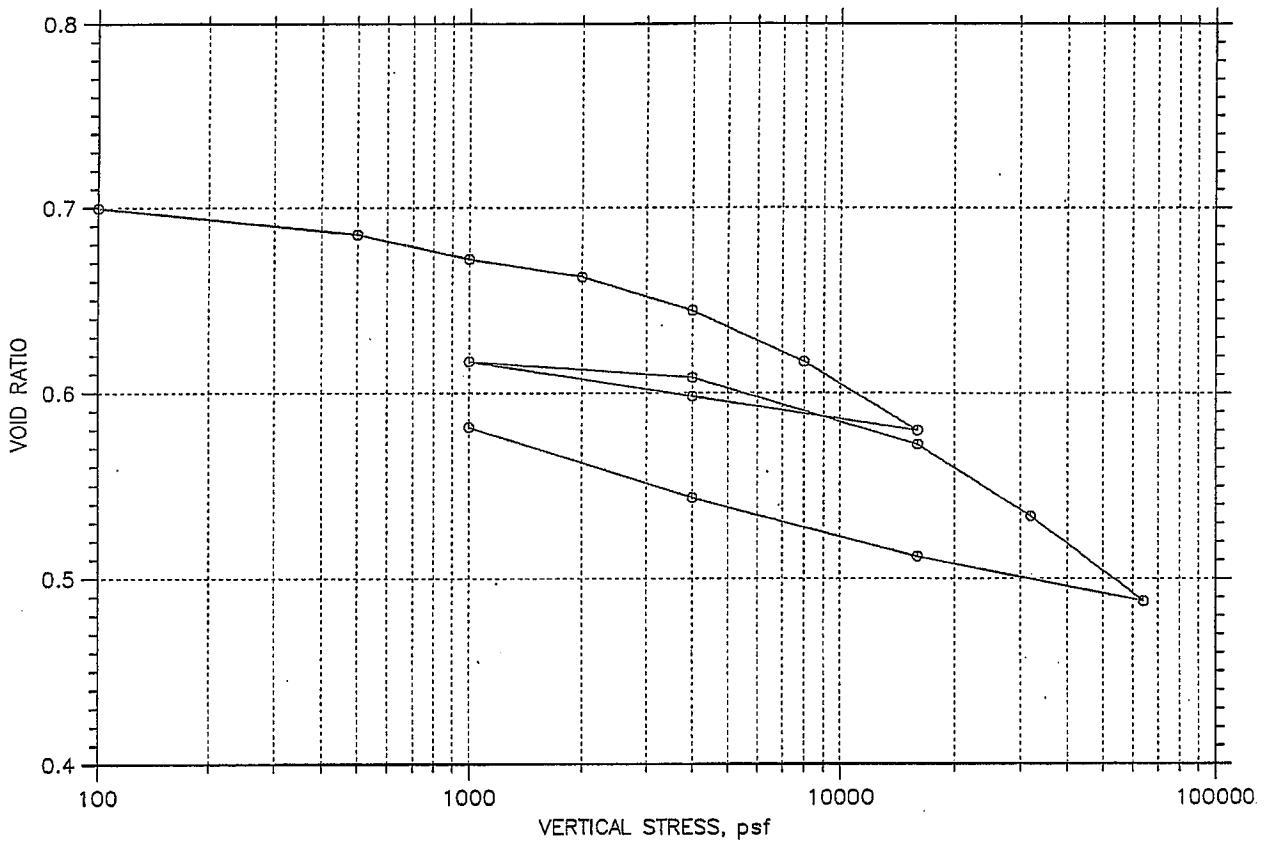
|                                          |        |                   |          | Before Test          | After Test |       |
|------------------------------------------|--------|-------------------|----------|----------------------|------------|-------|
| Overburden Pressure: 4900 psf            |        |                   |          | Water Content, %     | 21.29      | 20.71 |
| Preconsolidation Pressure: 1.04e+004 psf |        |                   |          | Dry Unit Weight, pcf | 101.9      | 109.7 |
| Compression Index: 0.153                 |        |                   |          | Saturation, %        | 84.11      | 99.02 |
| Diameter: 2.498 in                       |        | Height: 0.9974 in |          | Void Ratio           | 0.70       | 0.58  |
| LL: 60                                   | PL: 23 | PI: 37            | GS: 2.78 |                      |            |       |

|                                                      |                                                                    |  |                          |                         |
|------------------------------------------------------|--------------------------------------------------------------------|--|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria                                 |  | Location: B-2321UD UD-7  | Project No.: 6468071777 |
|                                                      | Boring No.: B-2321UD                                               |  | Tested By: BM            | Checked By: HJ          |
|                                                      | Sample No.: UD-7                                                   |  | Test Date: 3/28/08       | Depth: 38.5-40.2'       |
|                                                      | Test No.: 8358                                                     |  | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Very Pale Brown Mottled Brownish Yellow Fat Clay (CH) |  |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                                                    |  |                          | Cr= 0.032               |

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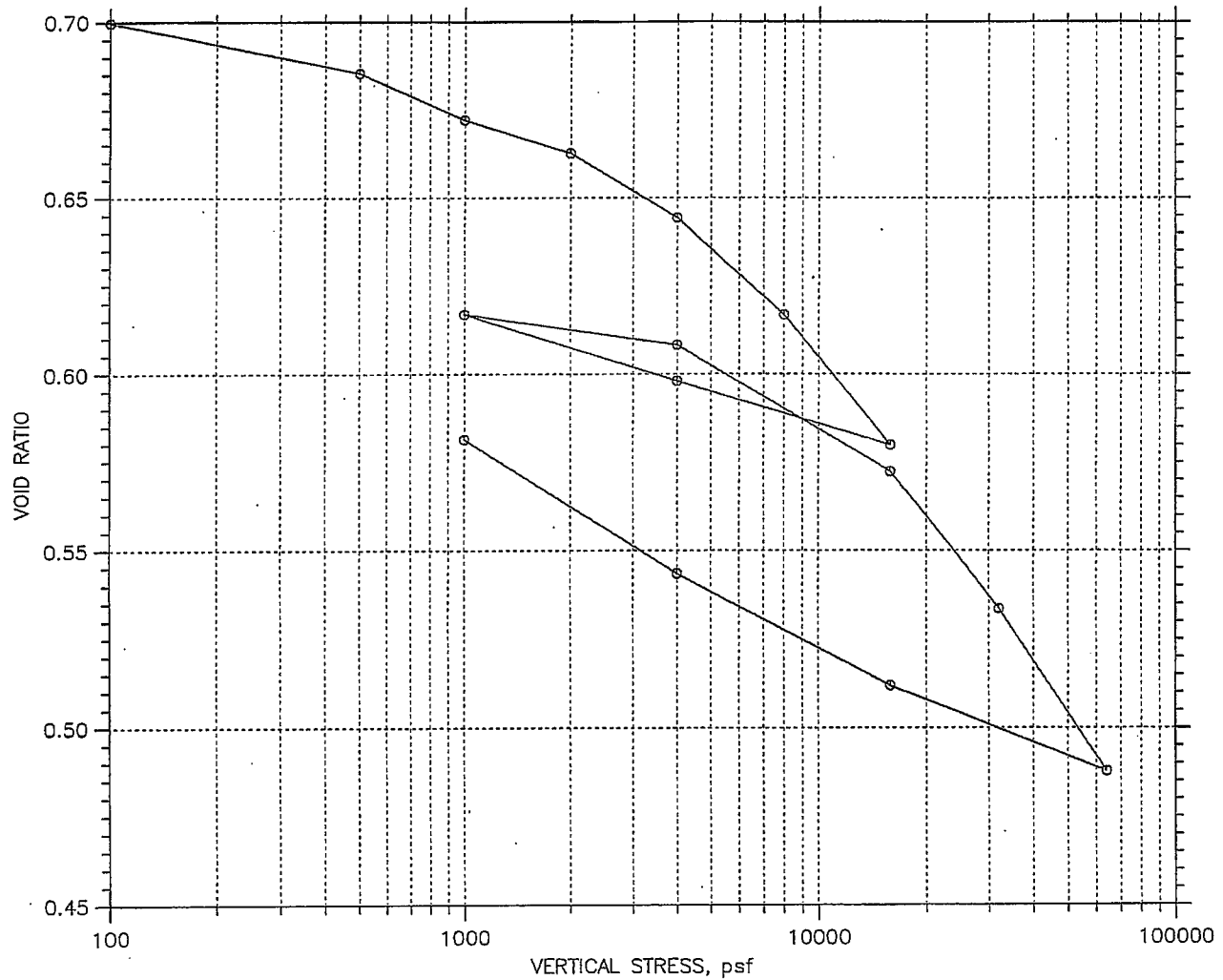
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                                    |                          |                         |
|--------------------------------|--------------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                                 | Location: B-2321UD UD-7  | Project No.: 6468071777 |
|                                | Boring No.: B-2321UD                                               | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-7                                                   | Test Date: 3/28/08       | Depth: 38.5-40.2'       |
|                                | Test No.: 8358                                                     | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Very Pale Brown Mottled Brownish Yellow Fat Clay (CH) |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04               |                          |                         |
|                                | Cr= 0.032                                                          |                          |                         |

Mon, 14-APR-2008 13:57:15

# CONSOLIDATION TEST DATA SUMMARY REPORT

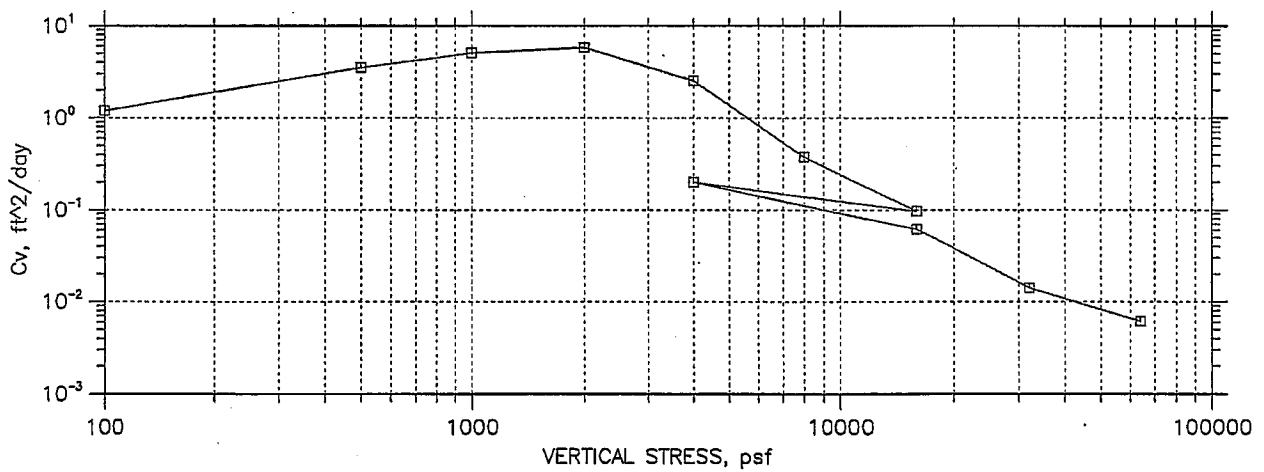
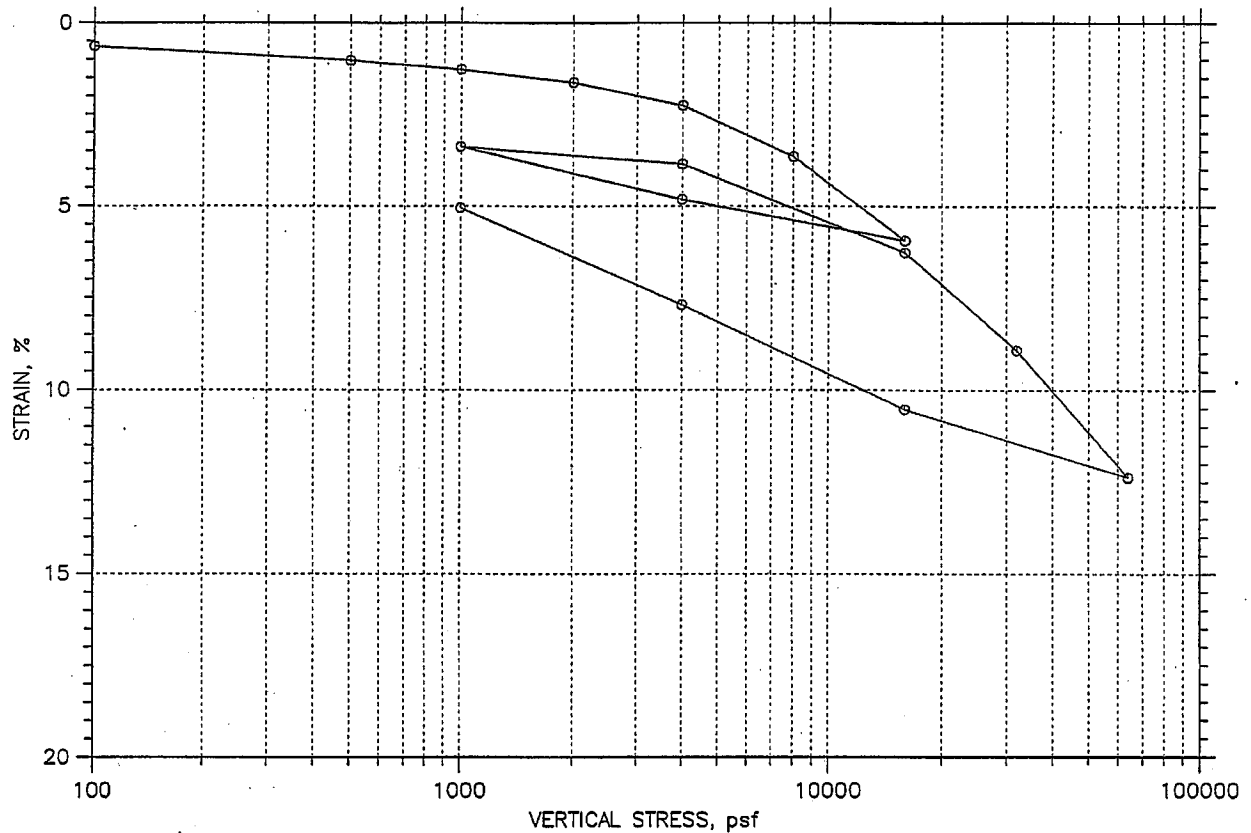


|                                          |                   |                      |          | Before Test | After Test |
|------------------------------------------|-------------------|----------------------|----------|-------------|------------|
| Overburden Pressure: 4900 psf            |                   | Water Content, %     |          | 21.29       | 20.71      |
| Preconsolidation Pressure: 1.04e+004 psf |                   | Dry Unit Weight, pcf |          | 101.9       | 109.7      |
| Compression Index: 0.153                 |                   | Saturation, %        |          | 84.11       | 99.02      |
| Diameter: 2.498 in                       | Height: 0.9974 in | Void Ratio           |          | 0.70        | 0.58       |
| LL: 60                                   | PL: 23            | PI: 37               | GS: 2.78 |             |            |

|                                                      |                                                                    |  |                          |                         |
|------------------------------------------------------|--------------------------------------------------------------------|--|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria                                 |  | Location: B-2321UD UD-7  | Project No.: 6468071777 |
|                                                      | Boring No.: B-2321UD                                               |  | Tested By: BM            | Checked By: HJ          |
|                                                      | Sample No.: UD-7                                                   |  | Test Date: 3/28/08       | Depth: 38.5-40.2'       |
|                                                      | Test No.: 8358                                                     |  | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Very Pale Brown Mottled Brownish Yellow Fat Clay (CH) |  |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                                                    |  |                          | Cr= 0.032               |

Mon, 14-APR-2008 13:57:15

# CONSOLIDATION TEST DATA SUMMARY REPORT

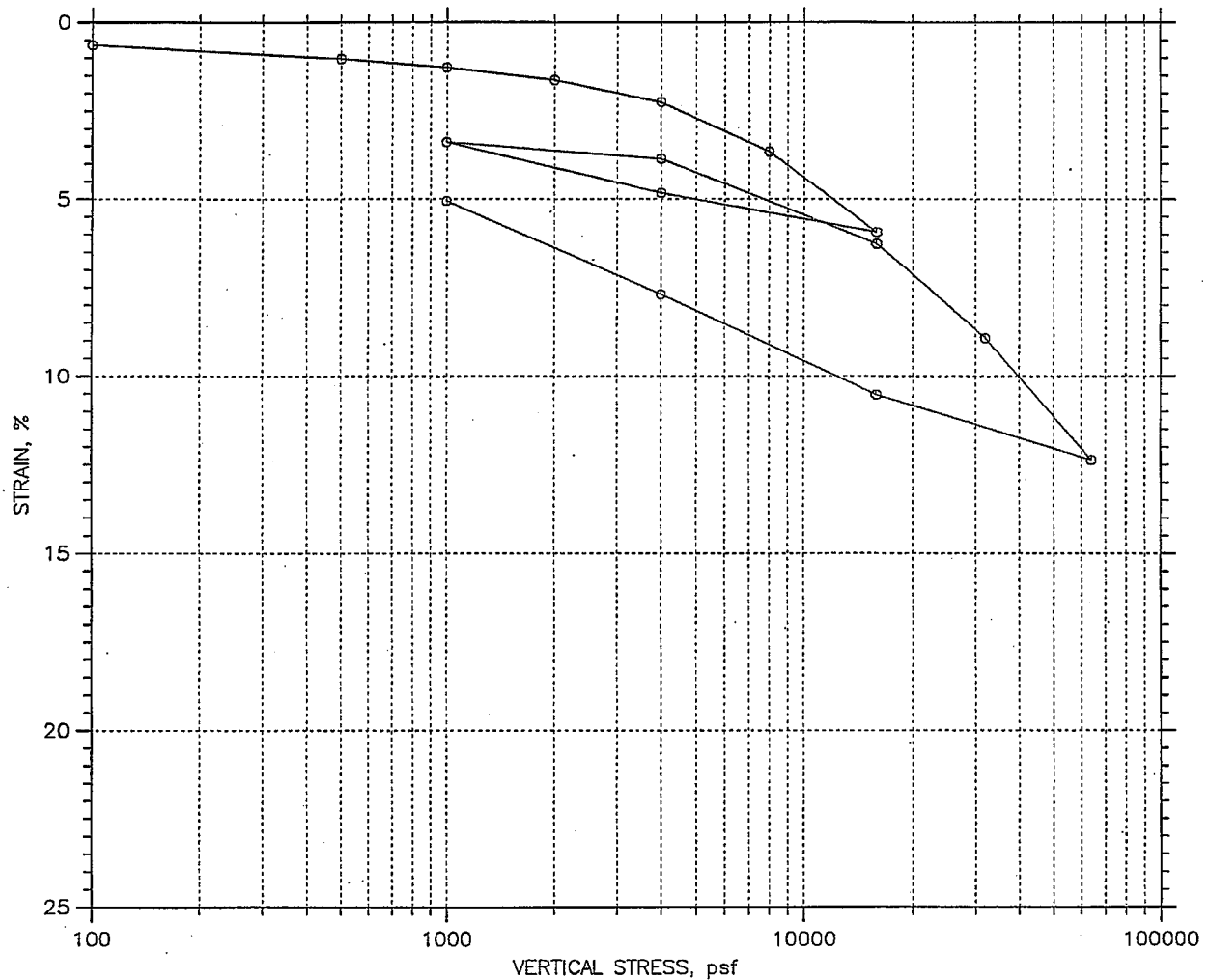


|                                                                                     |                                                      |                          |                                                                                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------|
|  | Project: Exelon Texas COL Victoria                   | Location: B-2321UD UD-14 | Project No.: 6468071777                                                                              |
|                                                                                     | Boring No.: B-2321UD                                 | Tested By: BM            | Checked By: HJ  |
|                                                                                     | Sample No.: UD-14                                    | Test Date: 4/18/08       | Depth: 128.5-130'                                                                                    |
|                                                                                     | Test No.: 8360                                       | Sample Type: Undisturbed | Elevation: N/A <u>5/5/08</u>                                                                         |
|                                                                                     | Description: Pale Yellow Fat CLAY with Sand (CH)     |                          |                                                                                                      |
|                                                                                     | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          |                                                                                                      |
|                                                                                     | Cr= 0.033                                            |                          |                                                                                                      |

Mon, 05-MAY-2008 15:29:59

KAW 5/9/08

# CONSOLIDATION TEST DATA SUMMARY REPORT

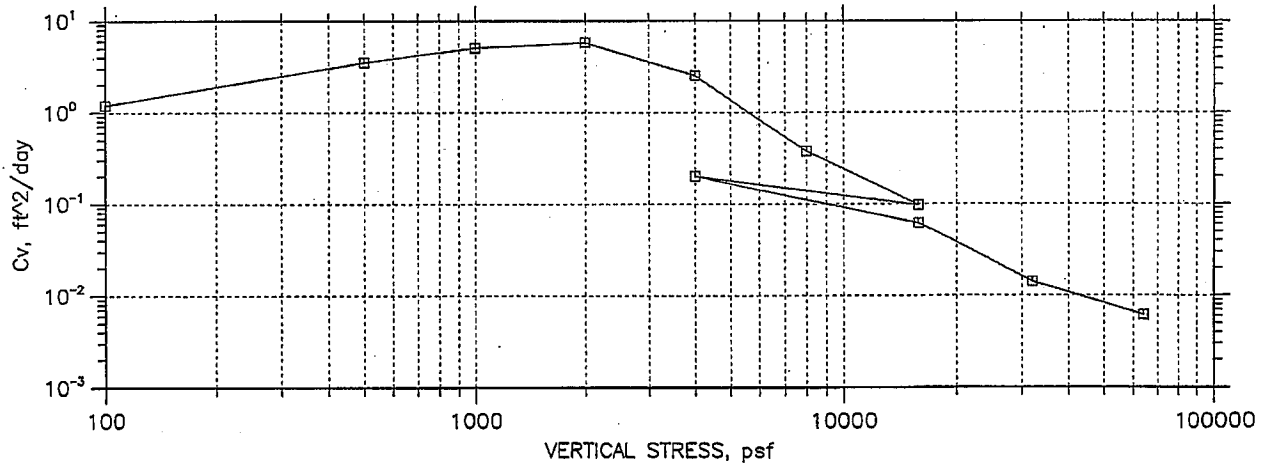
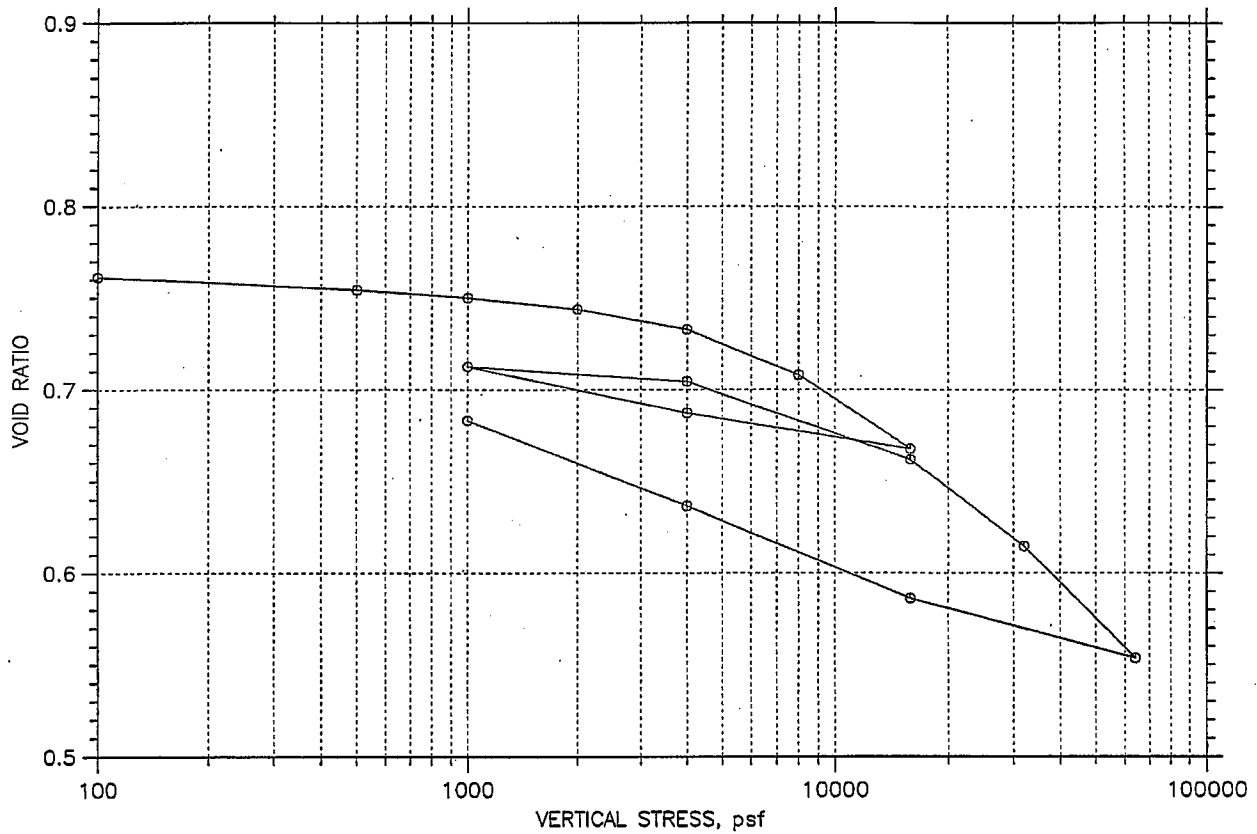


|                                          |  |                   |  | Before Test | After Test |
|------------------------------------------|--|-------------------|--|-------------|------------|
| Overburden Pressure: 1.12e+004 psf       |  |                   |  | 25.47       | 24.85      |
| Preconsolidation Pressure: 1.12e+004 psf |  |                   |  | 96.84       | 102.       |
| Compression Index: 0.203                 |  |                   |  | 90.64       | 100.03     |
| Diameter: 2.499 in                       |  | Height: 0.9945 in |  | Void Ratio  |            |
| LL: 58                                   |  | PL: 27            |  | 0.77        |            |
| PI: 31                                   |  | GS: 2.75          |  | 0.68        |            |

|  |                                                      |  |                          |                         |
|--|------------------------------------------------------|--|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                   |  | Location: B-2321UD UD-14 | Project No.: 6468071777 |
|  | Boring No.: B-2321UD                                 |  | Tested By: BM            | Checked By: HJ          |
|  | Sample No.: UD-14                                    |  | Test Date: 4/18/08       | Depth: 128.5-130'       |
|  | Test No.: 8360                                       |  | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Pale Yellow Fat CLAY with Sand (CH)     |  |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          |                         |
|  |                                                      |  |                          | Cr= 0.033               |

Mon, 05-MAY-2008 15:29:59

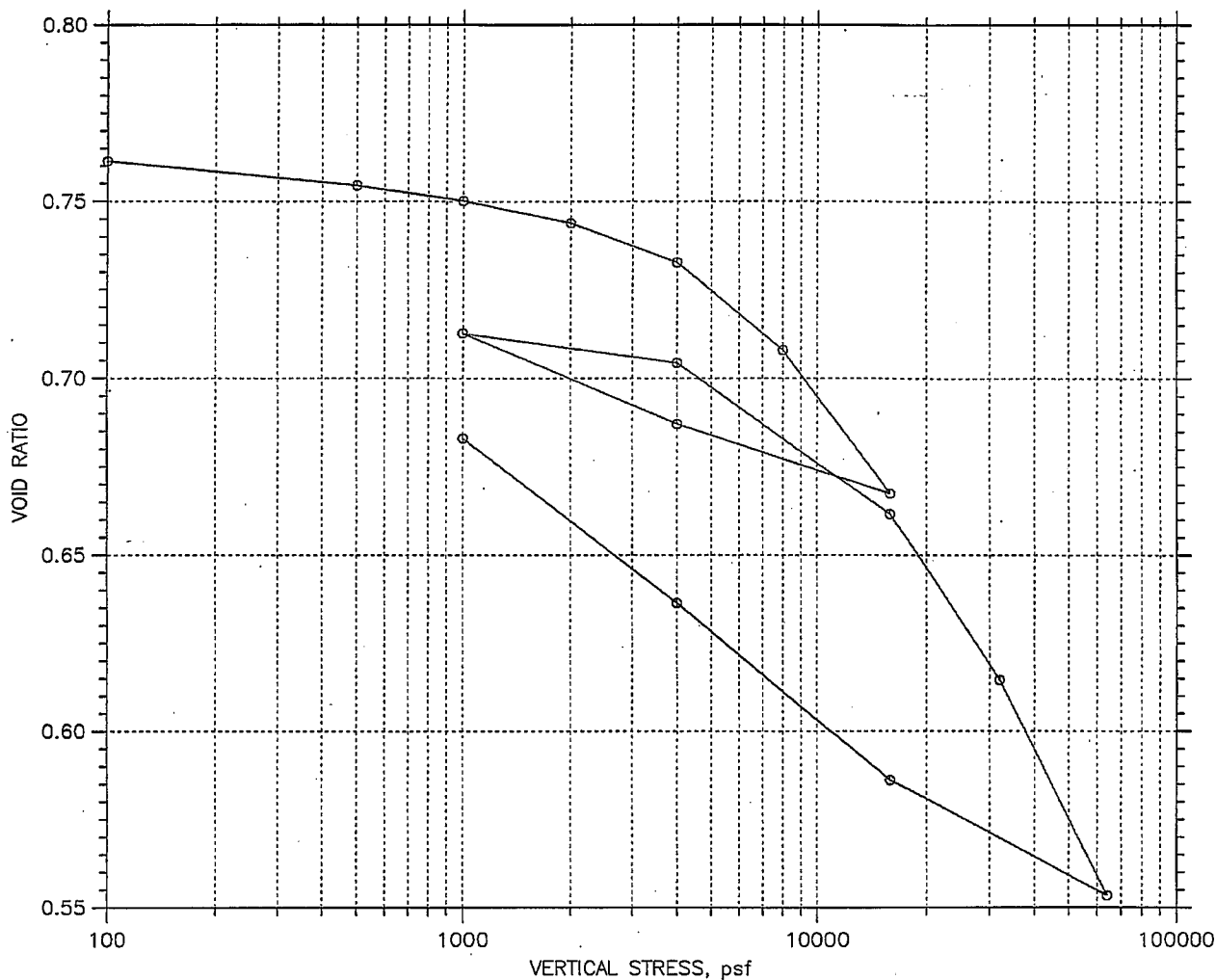
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                            |                                                      |                          |                         |
|--------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2321UD UD-14 | Project No.: 6468071777 |
|                                            | Boring No.: B-2321UD                                 | Tested By: BM            | Checked By: HJ          |
|                                            | Sample No.: UD-14                                    | Test Date: 4/18/08       | Depth: 128.5-130'       |
|                                            | Test No.: 8360                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Pale Yellow Fat CLAY with Sand (CH)     |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.033               |

Mon, 05-MAY-2008 15:29:45

# CONSOLIDATION TEST DATA SUMMARY REPORT

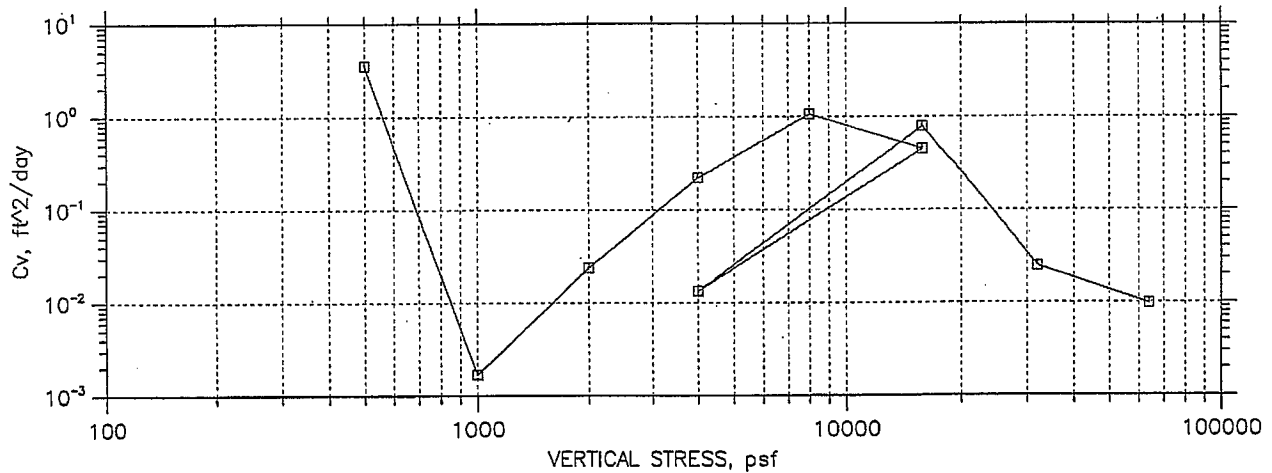
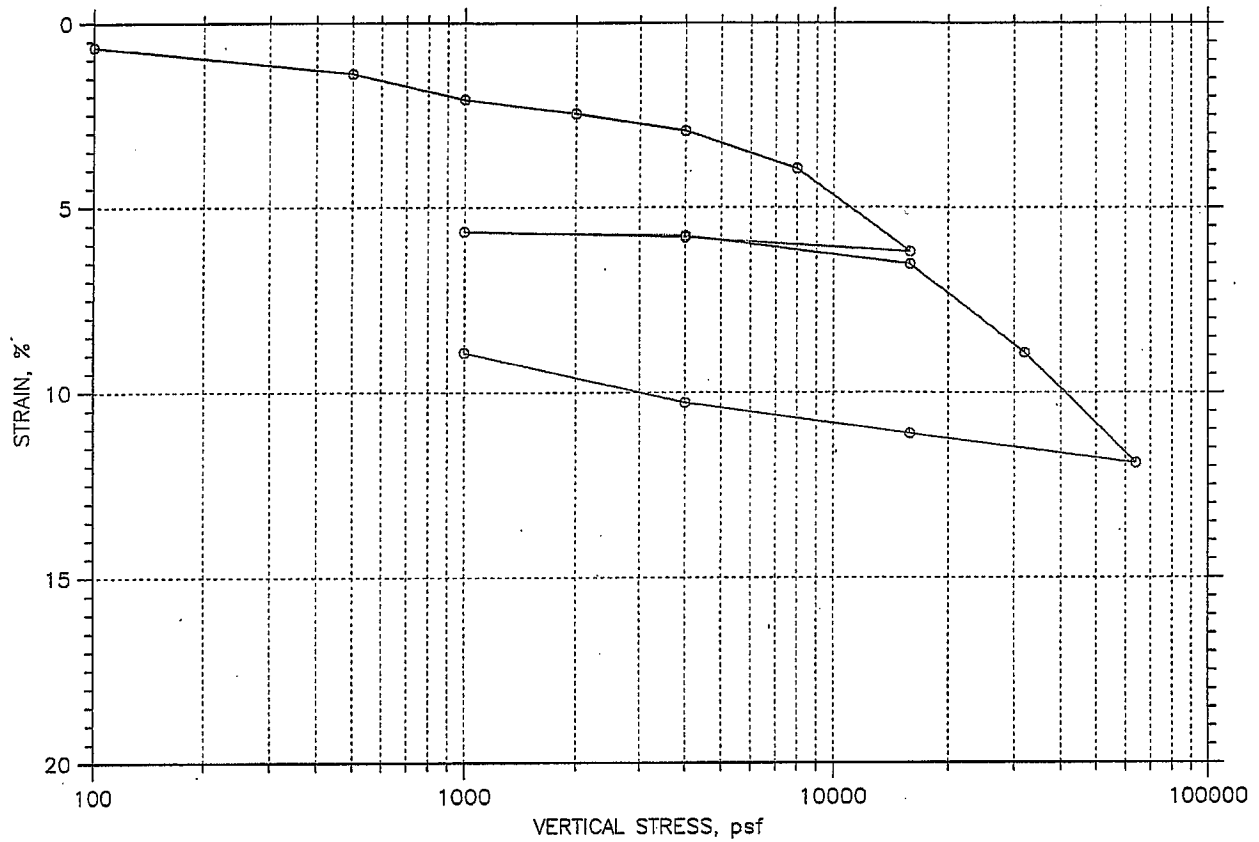


|                                          |  |                   |  | Before Test | After Test |
|------------------------------------------|--|-------------------|--|-------------|------------|
| Overburden Pressure: 1.12e+004 psf       |  |                   |  | 25.47       | 24.85      |
| Preconsolidation Pressure: 1.12e+004 psf |  |                   |  | 96.84       | 102.       |
| Compression Index: 0.203                 |  |                   |  | 90.64       | 100.03     |
| Diameter: 2.499 in                       |  | Height: 0.9945 in |  | Void Ratio  |            |
| LL: 58                                   |  | PI: 27            |  | 0.77        |            |
| GS: 2.75                                 |  |                   |  | 0.68        |            |

|  |                                                      |  |                          |                              |
|--|------------------------------------------------------|--|--------------------------|------------------------------|
|  | Project: Exelon Texas COL Victoria                   |  | Location: B-2321UD UD-14 | Project No.: 6468071777      |
|  | Boring No.: B-2321UD                                 |  | Tested By: BM            | Checked By: HJ <i>HJ</i>     |
|  | Sample No.: UD-14                                    |  | Test Date: 4/18/08       | Depth: 128.5-130'            |
|  | Test No.: 8360                                       |  | Sample Type: Undisturbed | Elevation: N/A <i>5/5/08</i> |
|  | Description: Pale Yellow Fat CLAY with Sand (CH)     |  |                          |                              |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          | Cr= 0.033                    |

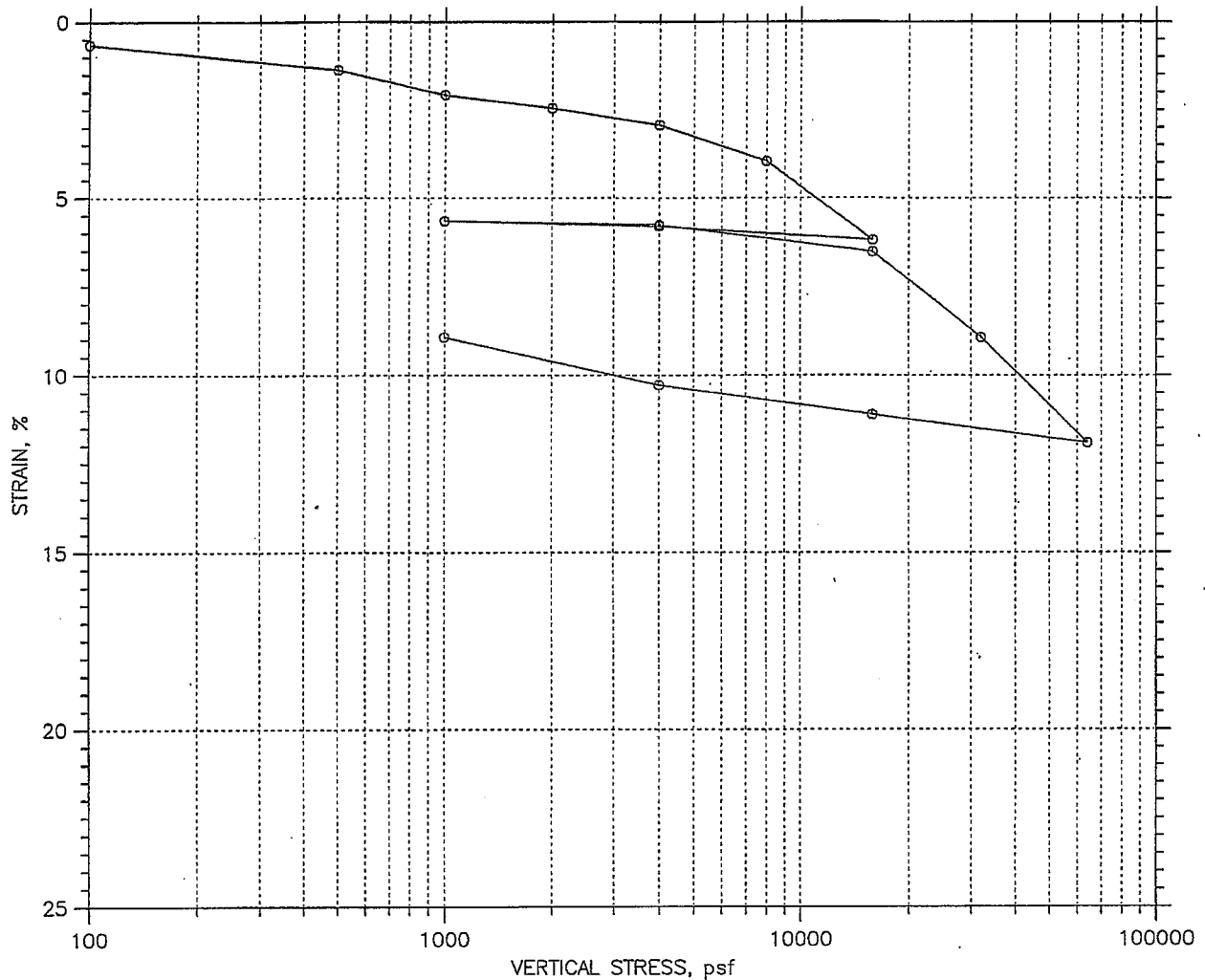
Mon, 05-MAY-2008 15:29:45

# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD UD-1  | Project No.: 6468071777 |
|                                | Boring No.: B-2352UD                                 | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-1                                     | Test Date: 2/26/08       | Depth: 3.5-5.2'         |
|                                | Test No.: 8361                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Pale Brown Sandy Lean CLAY (CL)         |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr=0.003                |

# CONSOLIDATION TEST DATA SUMMARY REPORT



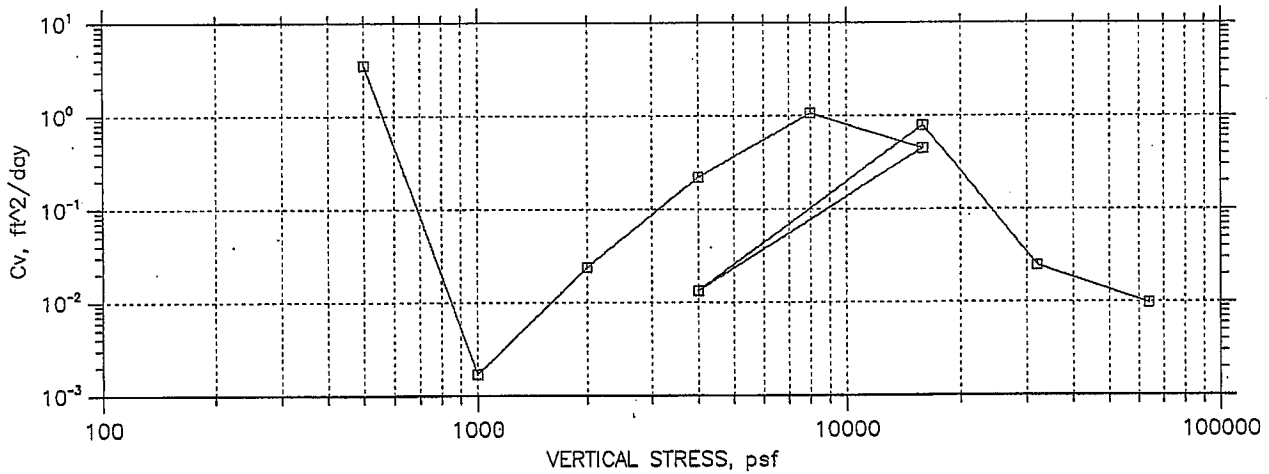
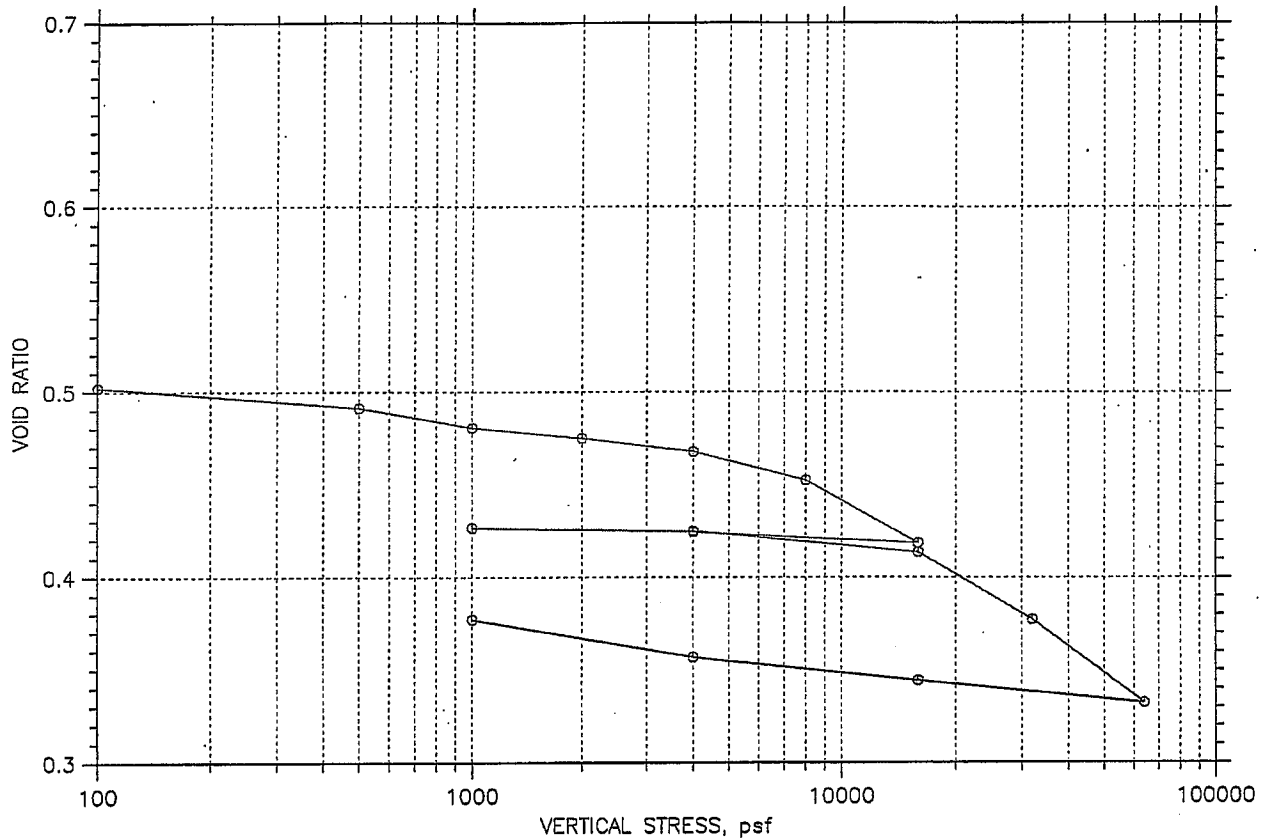
|                                          |        |                   |          | Before Test          | After Test |       |
|------------------------------------------|--------|-------------------|----------|----------------------|------------|-------|
| Overburden Pressure: 500 psf             |        |                   |          | Water Content, %     | 17.25      | 13.82 |
| Preconsolidation Pressure: 1.22e+004 psf |        |                   |          | Dry Unit Weight, pcf | 111.5      | 122.4 |
| Compression index: 0.149                 |        |                   |          | Saturation, %        | 90.97      | 98.97 |
| Diameter: 2.5 in                         |        | Height: 0.9963 in |          | Void Ratio           | 0.51       | 0.38  |
| LL: 46                                   | PL: 19 | PI: 27            | GS: 2.70 |                      |            |       |

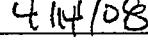
|        |                                                      |  |                          |                         |
|--------|------------------------------------------------------|--|--------------------------|-------------------------|
| MACTEC | Project: Exelon Texas COL Victoria                   |  | Location: B-2352UD UD-1  | Project No.: 6468071777 |
|        | Boring No.: B-2352UD                                 |  | Tested By: BM            | Checked By: HJ          |
|        | Sample No.: UD-1                                     |  | Test Date: 2/26/08       | Depth: 3.5-5.2'         |
|        | Test No.: 8361                                       |  | Sample Type: Undisturbed | Elevation: N/A          |
|        | Description: Pale Brown Sandy Lean CLAY (CL)         |  |                          |                         |
|        | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          |                         |
|        |                                                      |  |                          | Cr=0.003                |

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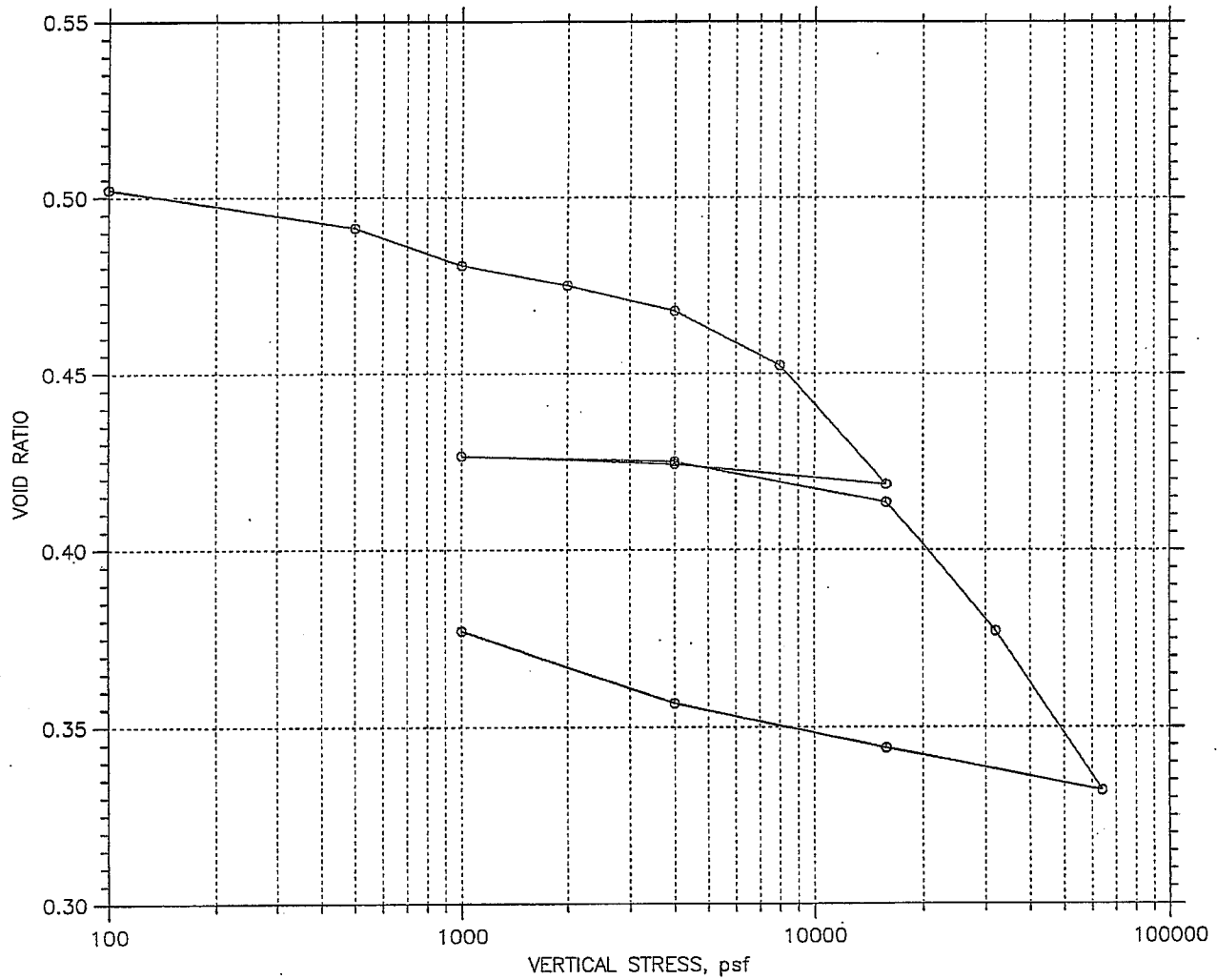
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                            |                                                      |                          |                                                                                                       |
|--------------------------------------------|------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD UD-1  | Project No.: 6468071777                                                                               |
|                                            | Boring No.: B-2352UD                                 | Tested By: BM            | Checked By: HJ   |
|                                            | Sample No.: UD-1                                     | Test Date: 2/26/08       | Depth: 3.5-5.2'  |
|                                            | Test No.: 8361                                       | Sample Type: Undisturbed | Elevation: N/A                                                                                        |
|                                            | Description: Pale Brown Sandy Lean CLAY (CL)         |                          |                                                                                                       |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr=0.003                                                                                              |

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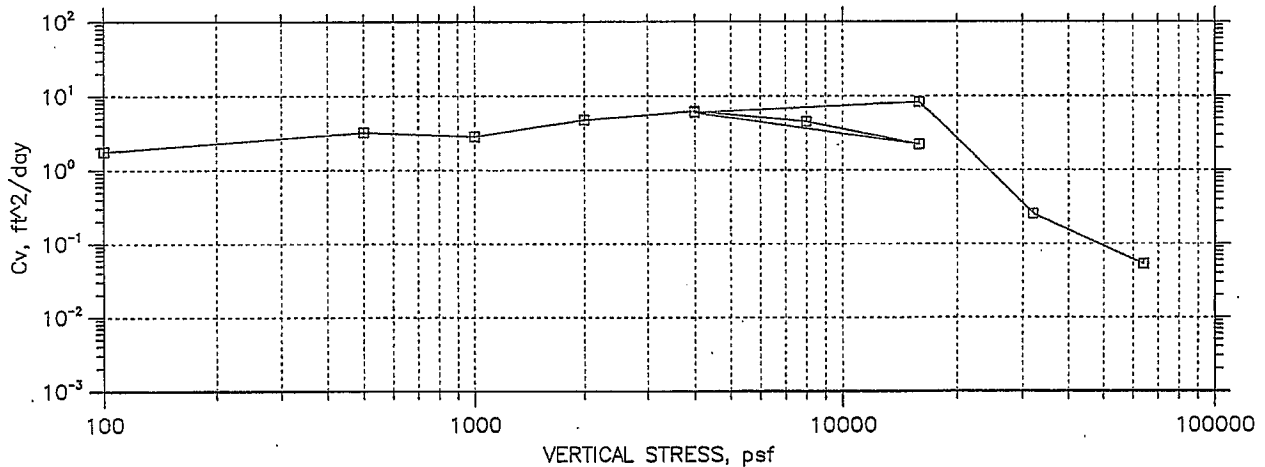
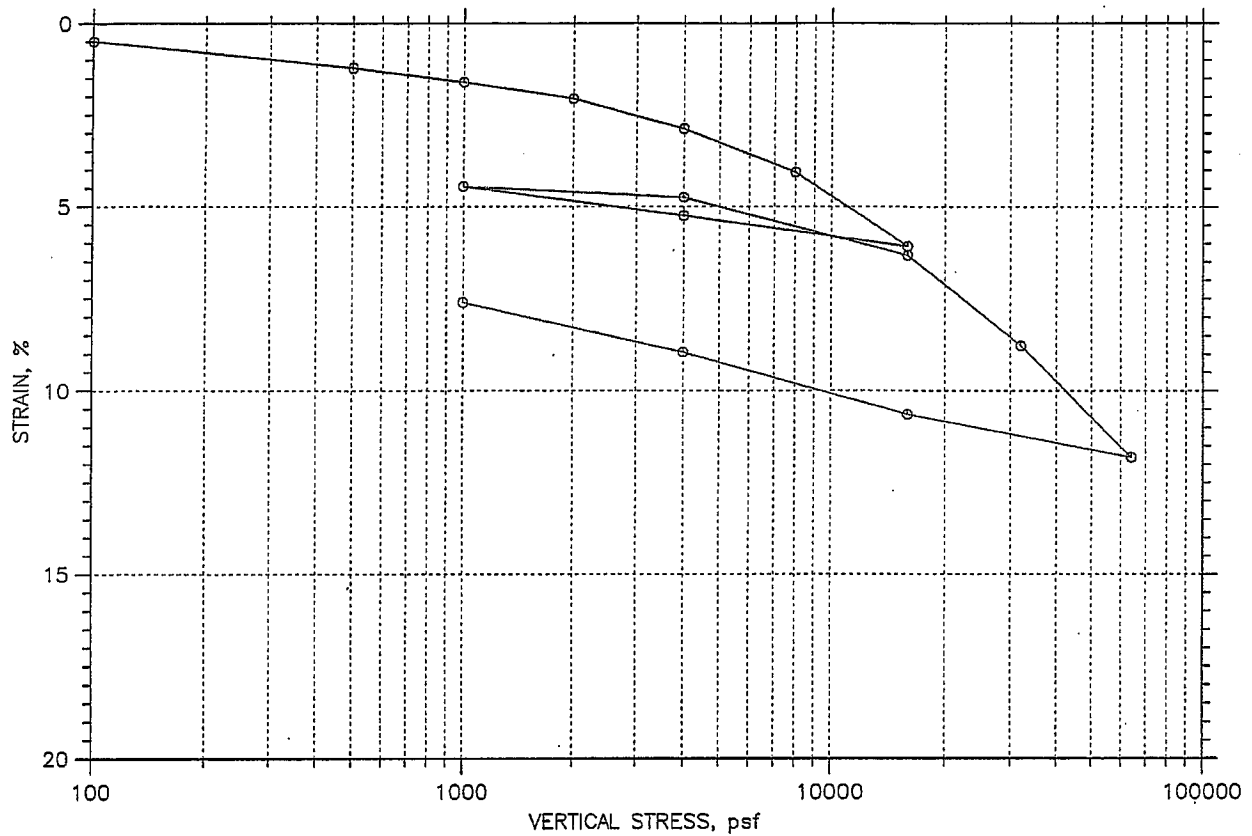
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                          |        |                   |          | Before Test | After Test |
|------------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 500 psf             |        |                   |          | 17.25       | 13.82      |
| Preconsolidation Pressure: 1.22e+004 psf |        |                   |          | 111.5       | 122.4      |
| Compression Index: 0.149                 |        |                   |          | 90.97       | 98.97      |
| Diameter: 2.5 in                         |        | Height: 0.9963 in |          | 0.51        | 0.38       |
| LL: 46                                   | PL: 19 | PI: 27            | GS: 2.70 |             |            |

|                                                      |                                              |  |                          |                                |
|------------------------------------------------------|----------------------------------------------|--|--------------------------|--------------------------------|
| <div> <div></div> <div>MACTEC</div> </div>           | Project: Exelon Texas COL Victoria           |  | Location: B-2352UD UD-1  | Project No.: 6468071777        |
|                                                      | Boring No.: B-2352UD                         |  | Tested By: BM            | Checked By: HJ <i>HJ</i>       |
|                                                      | Sample No.: UD-1                             |  | Test Date: 2/26/08       | Depth: 3.5-5.2' <i>4/14/08</i> |
|                                                      | Test No.: 8361                               |  | Sample Type: Undisturbed | Elevation: N/A                 |
|                                                      | Description: Pale Brown Sandy Lean CLAY (CL) |  |                          |                                |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                              |  |                          | Cr=0.003                       |

# CONSOLIDATION TEST DATA SUMMARY REPORT

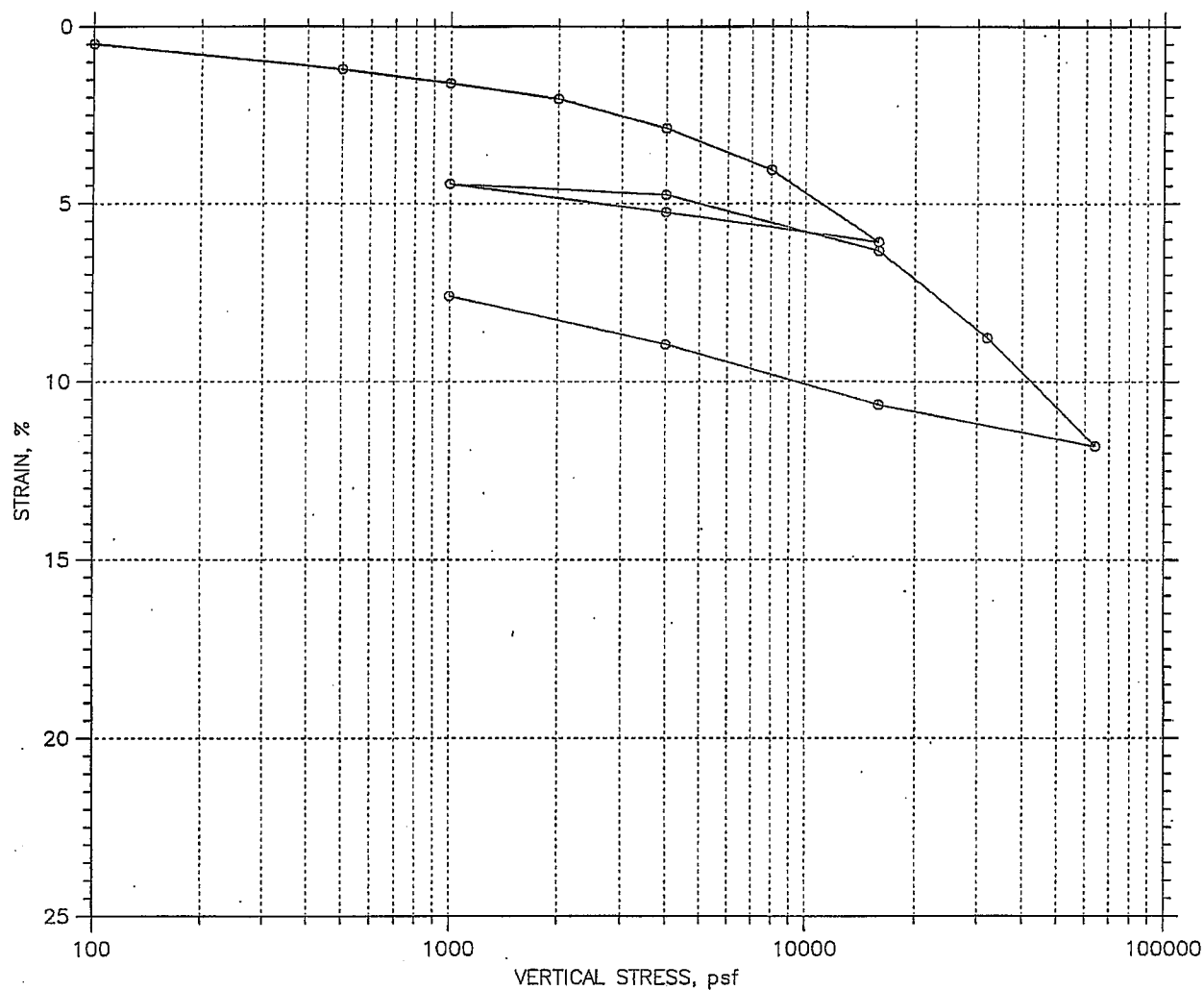


|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD UD-3  | Project No.: 6468071777 |
|                                | Boring No.: B-2352UD                                 | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-3                                     | Test Date: 2/26/08       | Depth: 11.5-13.2'       |
|                                | Test No.: 8362                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Yellowish Brown Lean CLAY (CL)          |                          | Cr= 0.020               |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          |                         |

Mon, 14-APR-2008 14:20:07

KAW 4.15.08

# CONSOLIDATION TEST DATA SUMMARY REPORT

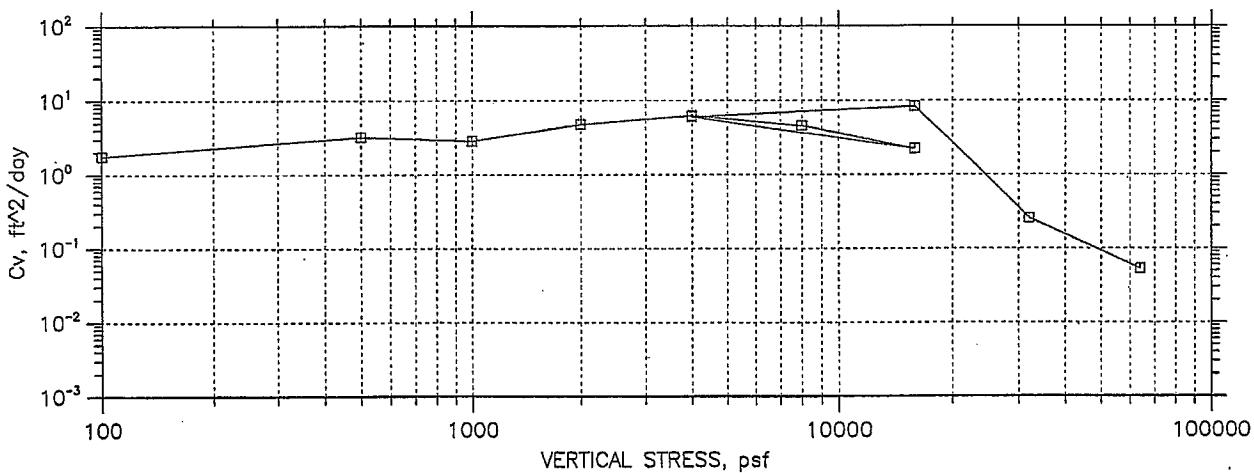
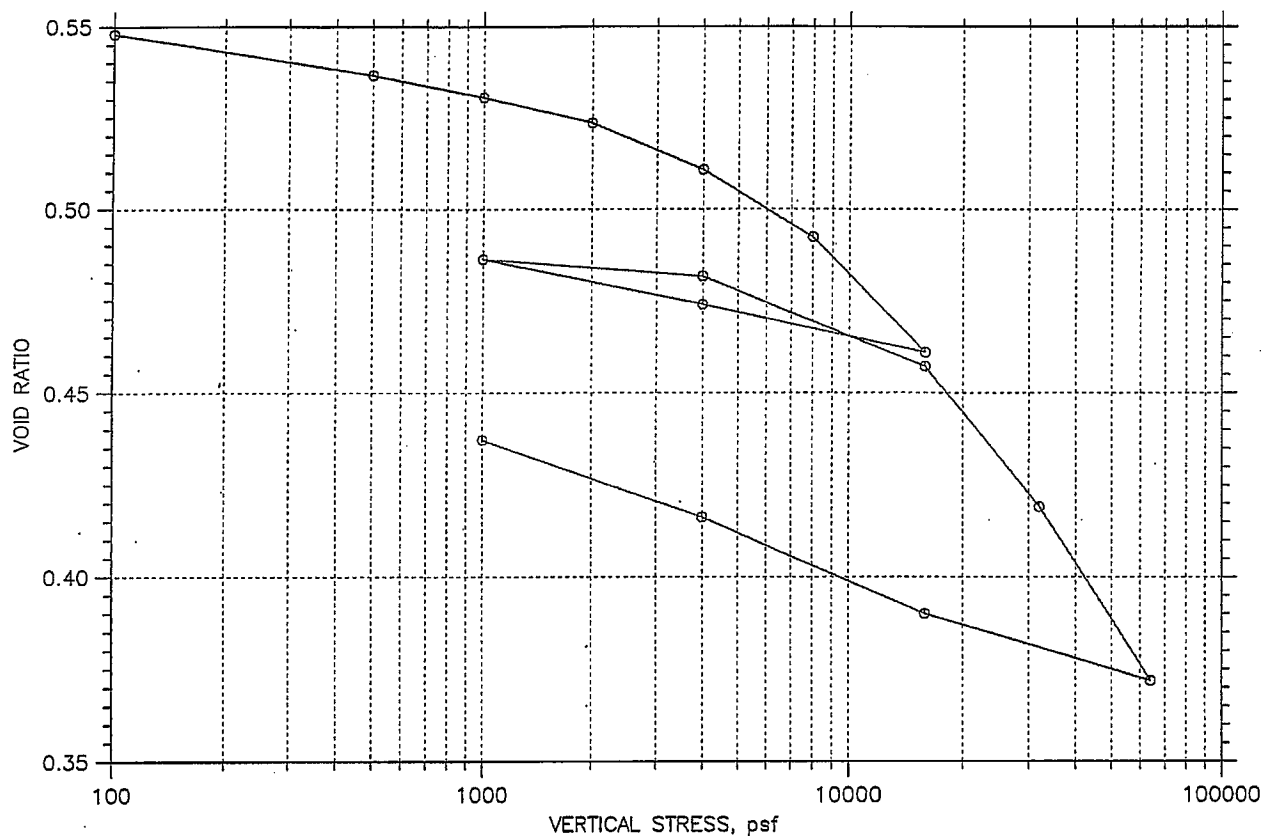


|                                          |        |                   |          | Before Test          | After Test |       |
|------------------------------------------|--------|-------------------|----------|----------------------|------------|-------|
| Overburden Pressure: 1500 psf            |        |                   |          | Water Content, %     | 18.36      | 15.77 |
| Preconsolidation Pressure: 1.34e+004 psf |        |                   |          | Dry Unit Weight, pcf | 108.8      | 117.7 |
| Compression Index: 0.156                 |        |                   |          | Saturation, %        | 89.55      | 97.74 |
| Diameter: 2.499 in                       |        | Height: 0.9963 in |          | Void Ratio           | 0.56       | 0.44  |
| LL: 39                                   | PL: 18 | PI: 21            | GS: 2.71 |                      |            |       |

|  |                                                      |  |                          |                         |
|--|------------------------------------------------------|--|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                   |  | Location: B-2352UD UD-3  | Project No.: 6468071777 |
|  | Boring No.: B-2352UD                                 |  | Tested By: BM            | Checked By: HJ          |
|  | Sample No.: UD-3                                     |  | Test Date: 2/26/08       | Depth: 11.5-13.2'       |
|  | Test No.: 8362                                       |  | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Yellowish Brown Lean CLAY (CL)          |  |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          |                         |
|  |                                                      |  |                          | Cr= 0.020               |

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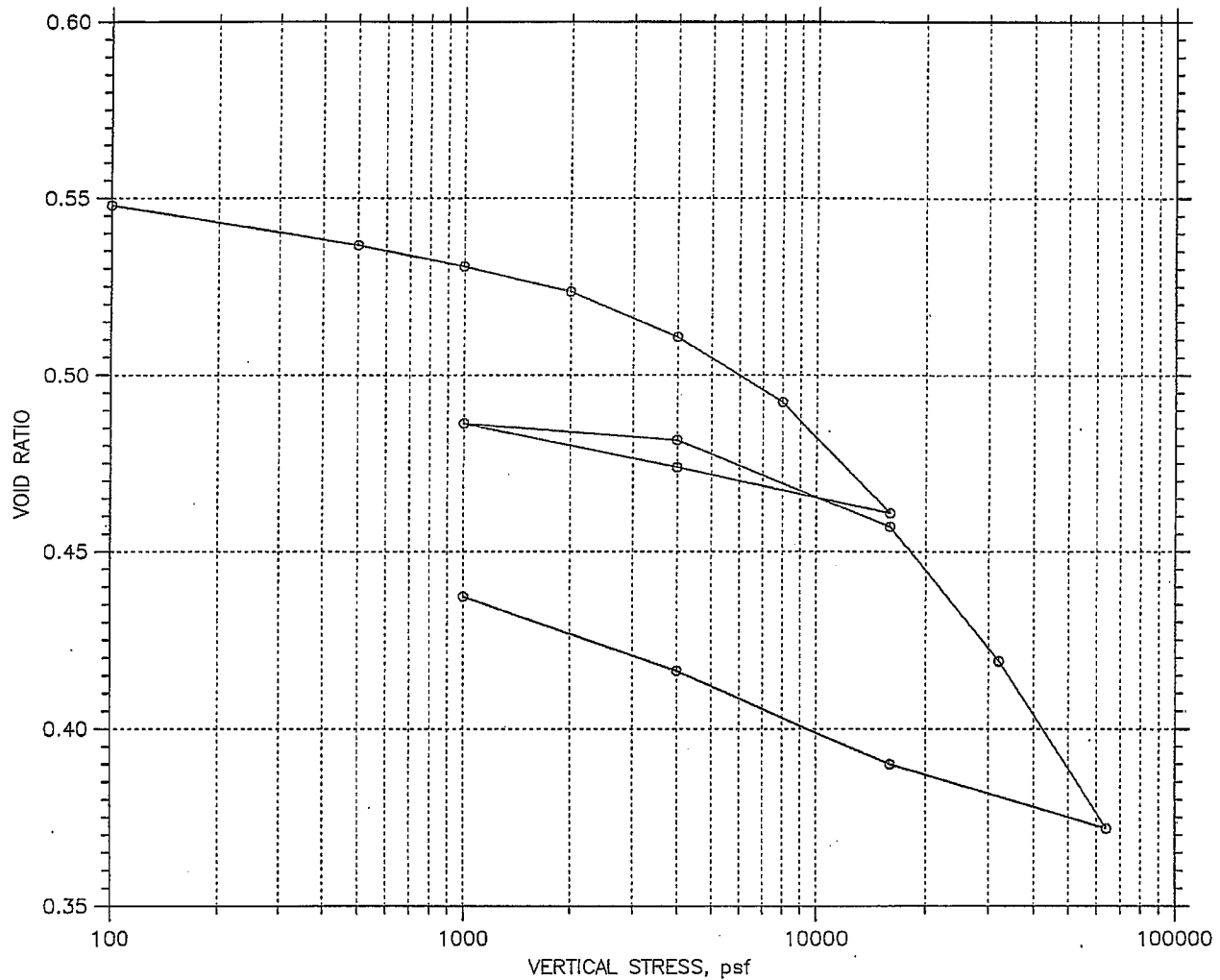
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD UD-3  | Project No.: 6468071777 |
|                                | Boring No.: B-2352UD                                 | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-3                                     | Test Date: 2/26/08       | Depth: 11.5-13.2'       |
|                                | Test No.: 8362                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Yellowish Brown Lean CLAY (CL)          |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.020               |

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# CONSOLIDATION TEST DATA SUMMARY REPORT

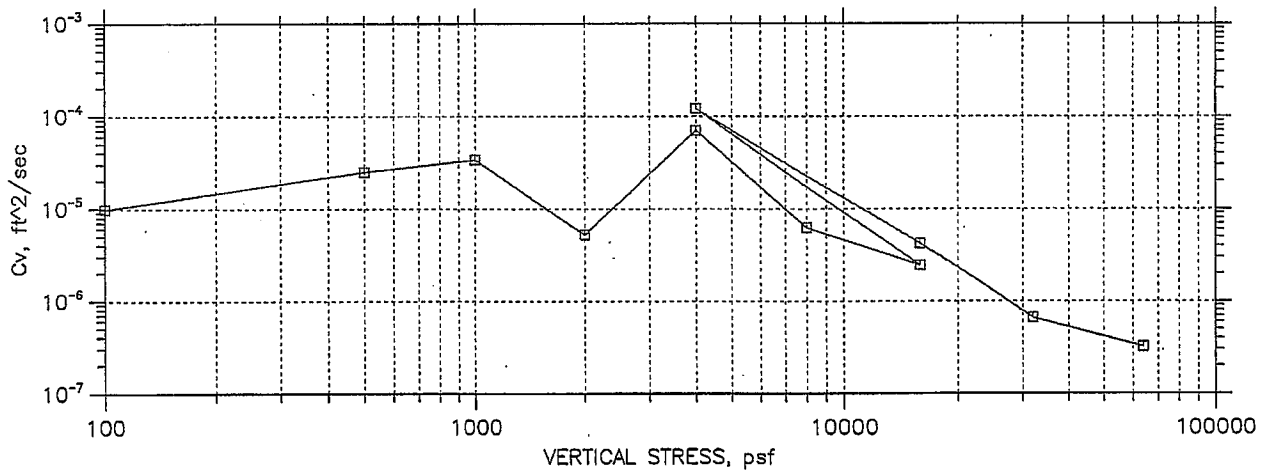
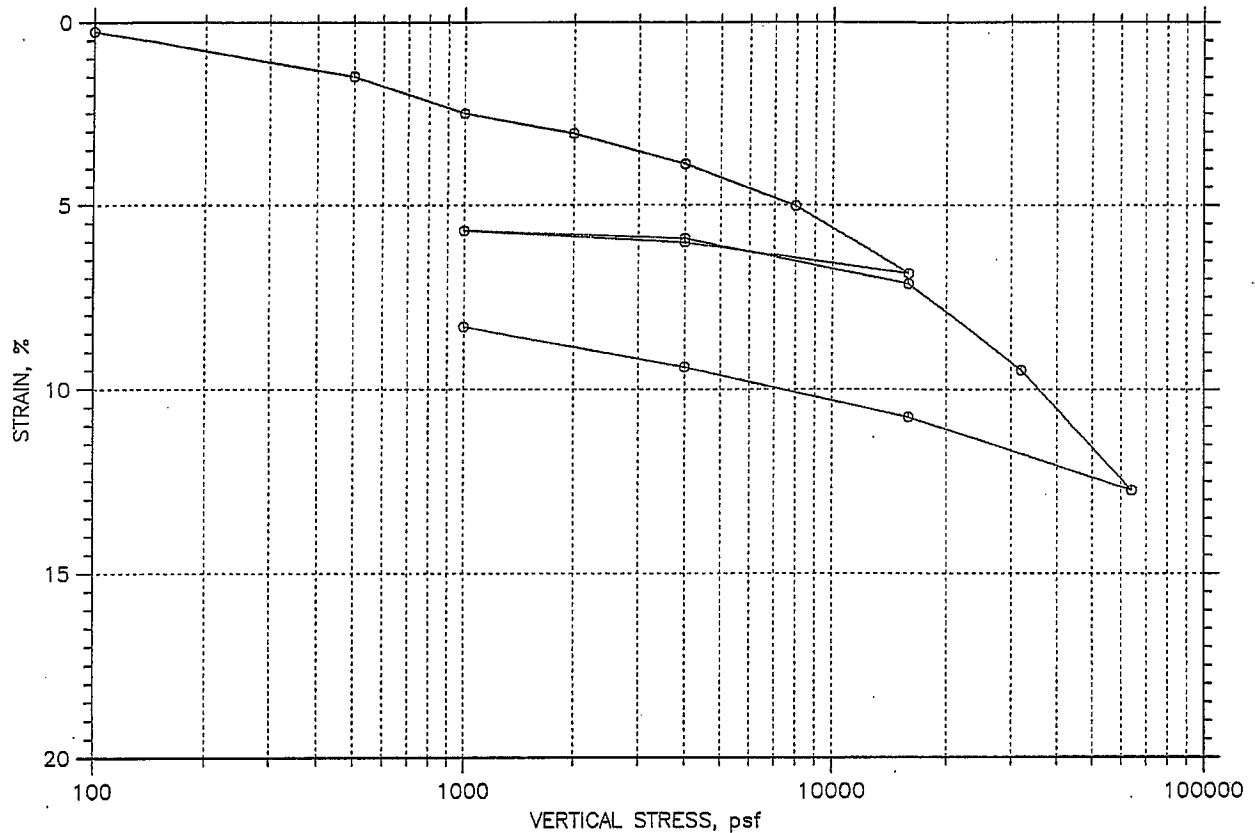


|                                          |        |                   |          | Before Test          | After Test |       |
|------------------------------------------|--------|-------------------|----------|----------------------|------------|-------|
| Overburden Pressure: 1500 psf            |        |                   |          | Water Content, %     | 18.36      | 15.77 |
| Preconsolidation Pressure: 1.34e+004 psf |        |                   |          | Dry Unit Weight, pcf | 108.8      | 117.7 |
| Compression Index: 0.156                 |        |                   |          | Saturation, %        | 89.55      | 97.74 |
| Diameter: 2.499 in                       |        | Height: 0.9963 in |          | Void Ratio           | 0.56       | 0.44  |
| LL: 39                                   | PL: 18 | PI: 21            | GS: 2.71 |                      |            |       |

|                                                                                                 |                                                      |  |                          |                         |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------|--|--------------------------|-------------------------|
| <div style="background-color: #cccccc; padding: 5px; text-align: center;"> <b>MACTEC</b> </div> | Project: Exelon Texas COL Victoria                   |  | Location: B-2352UD UD-3  | Project No.: 6468071777 |
|                                                                                                 | Boring No.: B-2352UD                                 |  | Tested By: BM            | Checked By: HJ          |
|                                                                                                 | Sample No.: UD-3                                     |  | Test Date: 2/26/08       | Depth: 11.5-13.2'       |
|                                                                                                 | Test No.: 8362                                       |  | Sample Type: Undisturbed | Elevation: N/A          |
|                                                                                                 | Description: Yellowish Brown Lean CLAY (CL)          |  |                          |                         |
|                                                                                                 | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          |                         |
|                                                                                                 |                                                      |  |                          | Cr= 0.020               |

Mon, 14-APR-2008 14:19:58

# CONSOLIDATION TEST DATA SUMMARY REPORT

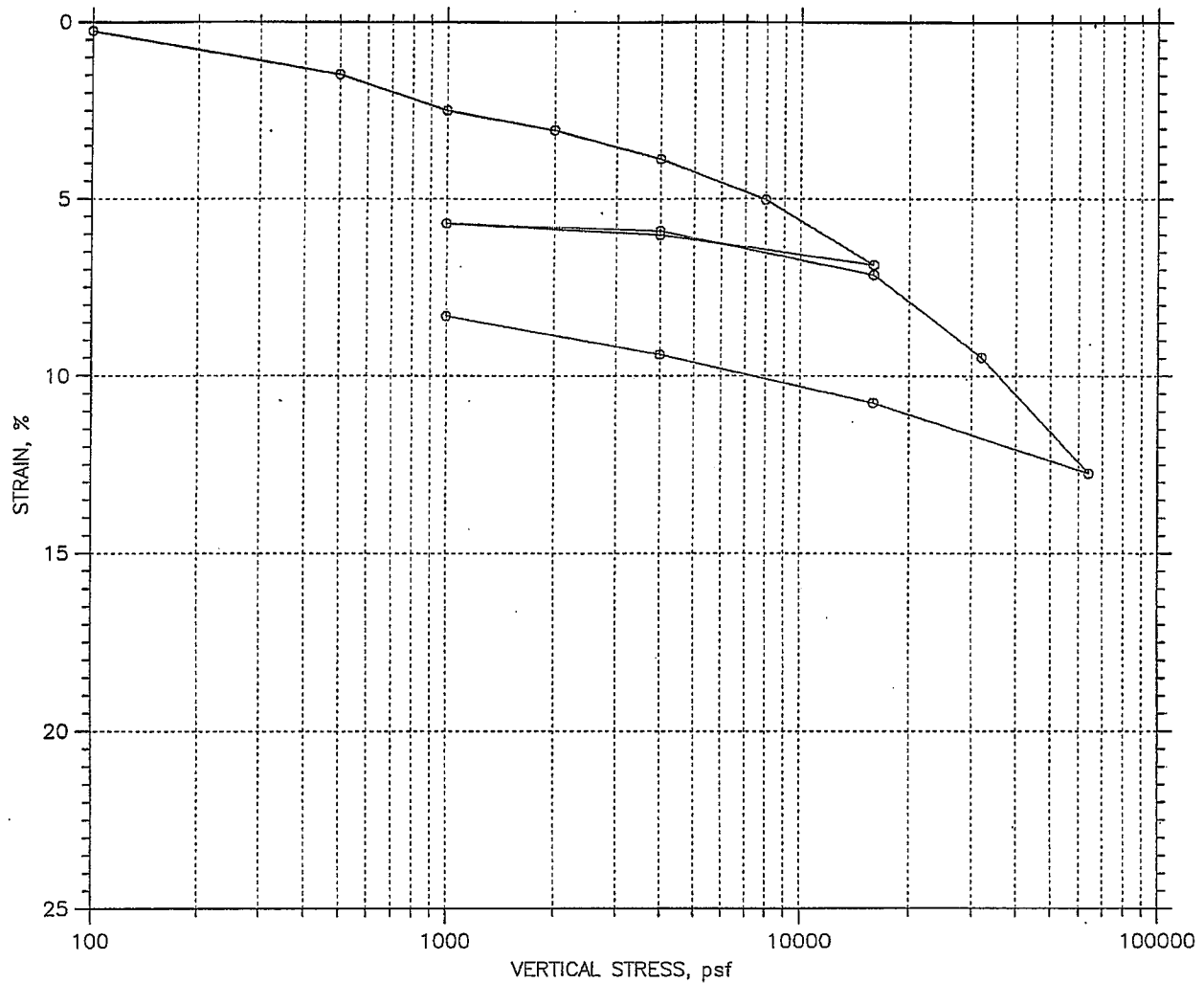


|                                            |                                                      |                          |                         |
|--------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD       | Project No.: 6468071777 |
|                                            | Boring No.: B-2352UD                                 | Tested By: HJ            | Checked By: JW          |
|                                            | Sample No.: UD-5                                     | Test Date: 3/6/08        | Depth: 24-25.7'         |
|                                            | Test No.: 8363                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Brownish Yellow Fat CLAY (CH)           |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.010               |

Mon, 14-APR-2008 14:01:53

KAW 4.15.08

# CONSOLIDATION TEST DATA SUMMARY REPORT



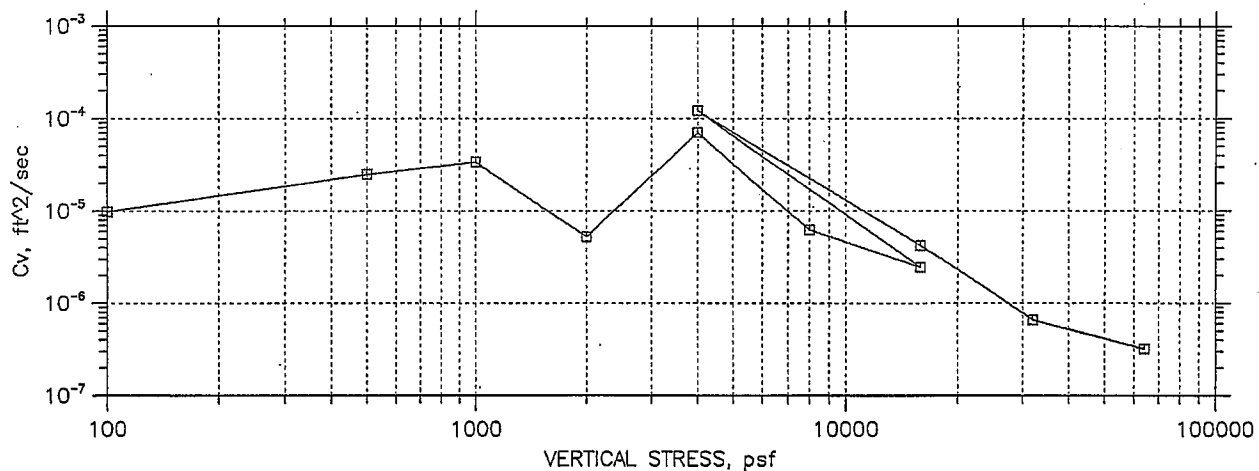
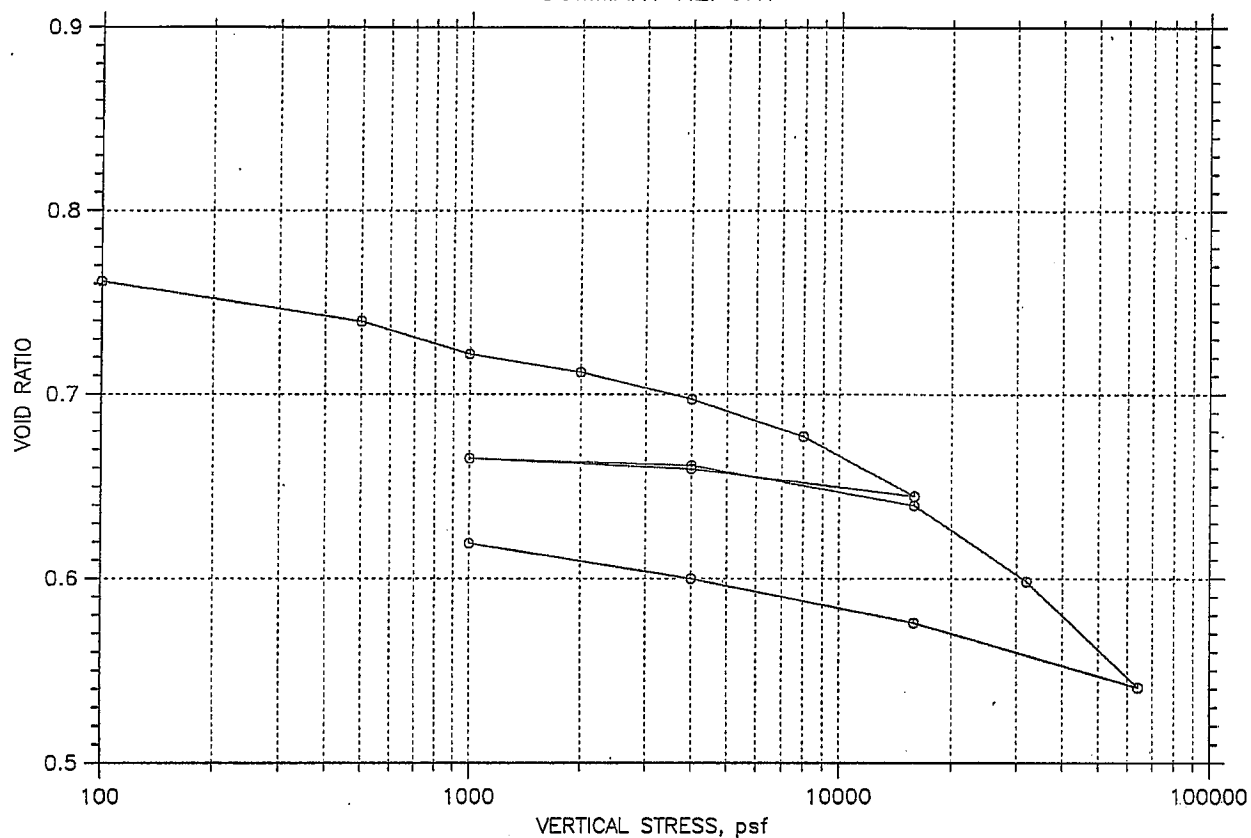
|                                          |        |                   |          | Before Test | After Test |
|------------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 3100 psf            |        |                   |          | 28.01       | 22.98      |
| Preconsolidation Pressure: 1.48e+004 psf |        |                   |          | 94.4        | 103.       |
| Compression Index: 0.189                 |        |                   |          | 97.66       | 99.10      |
| Diameter: 2.498 in                       |        | Height: 0.9978 in |          | 0.77        | 0.62       |
| LL: 67                                   | PL: 29 | PI: 38            | GS: 2.67 |             |            |

|                                            |                                                      |                          |                         |
|--------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD       | Project No.: 6468071777 |
|                                            | Boring No.: B-2352UD                                 | Tested By: HJ            | Checked By: JW          |
|                                            | Sample No.: UD-5                                     | Test Date: 3/6/08        | Depth: 24-25.7'         |
|                                            | Test No.: 8363                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Brownish Yellow Fat CLAY (CH)           |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.010               |

Mon, 14-APR-2008 14:01:53



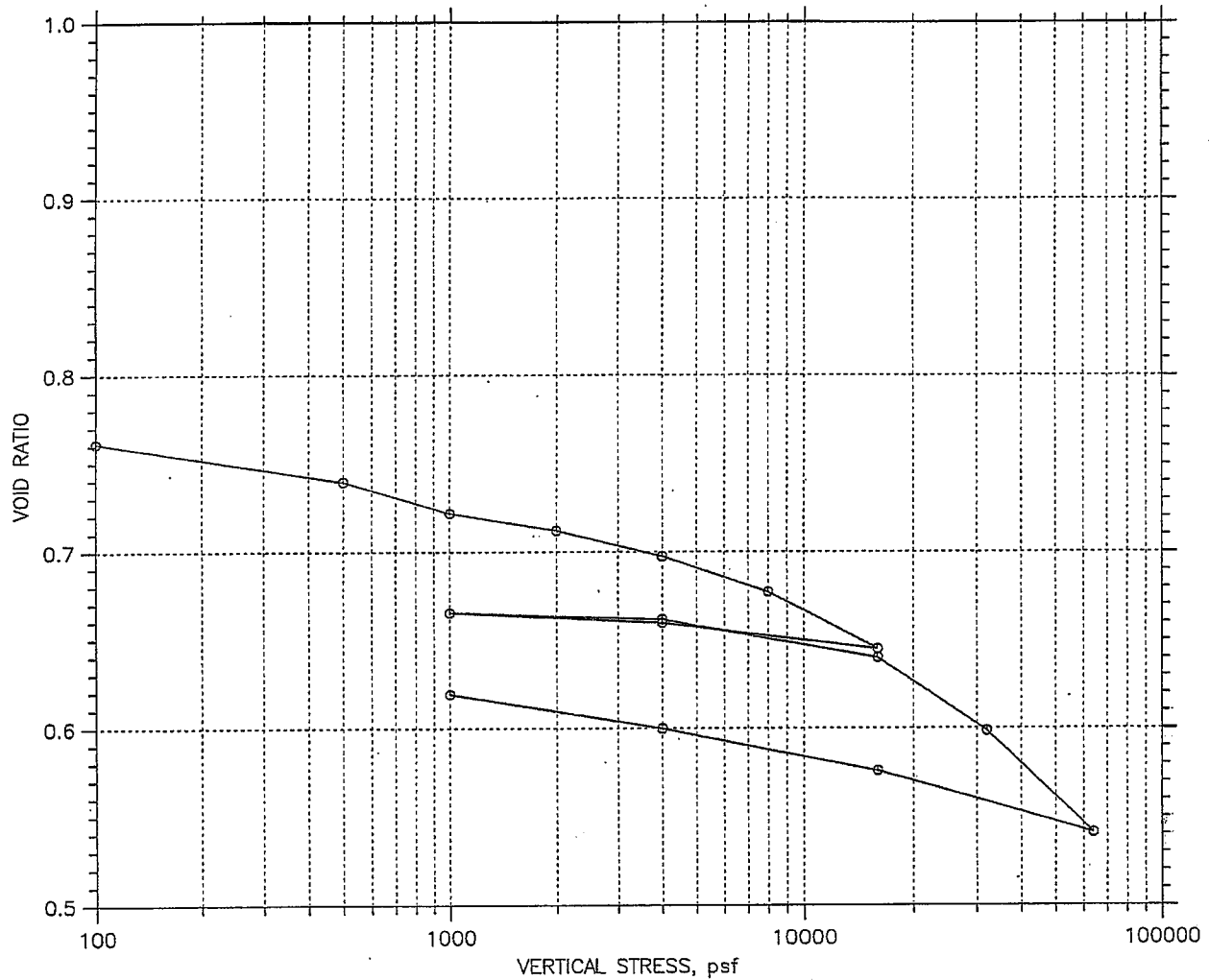
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2352UD       | Project No.: 6468071777 |
|                                | Boring No.: B-2352UD                                 | Tested By: HJ            | Checked By: JW          |
|                                | Sample No.: UD-5                                     | Test Date: 3/6/08        | Depth: 24-25.7'         |
|                                | Test No.: 8363                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Brownish Yellow Fat CLAY (CH)           |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          |                         |
|                                | Cr= 0.010                                            |                          |                         |

Mon, 14-APR-2008 14:02:05

# CONSOLIDATION TEST DATA SUMMARY REPORT

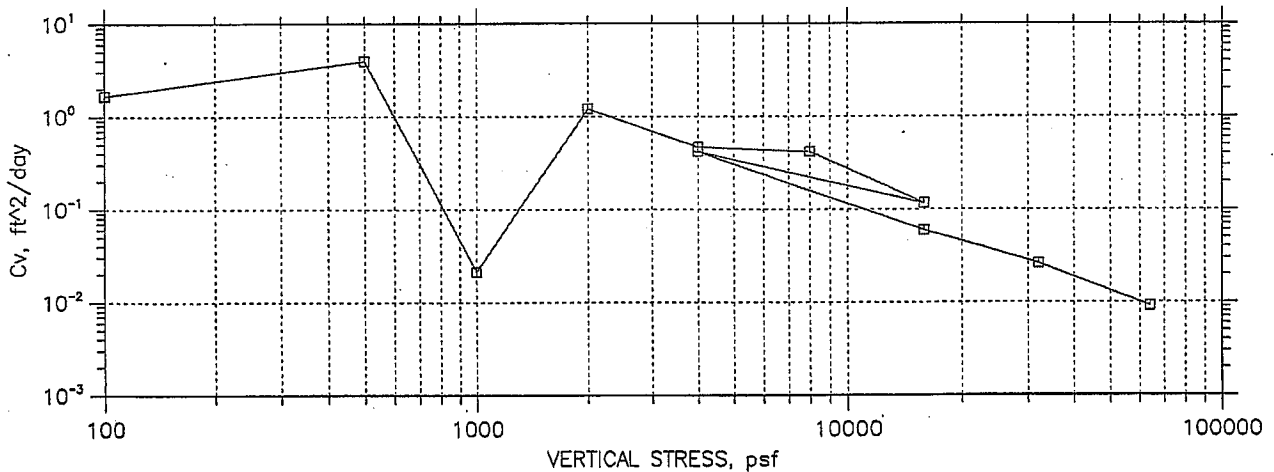
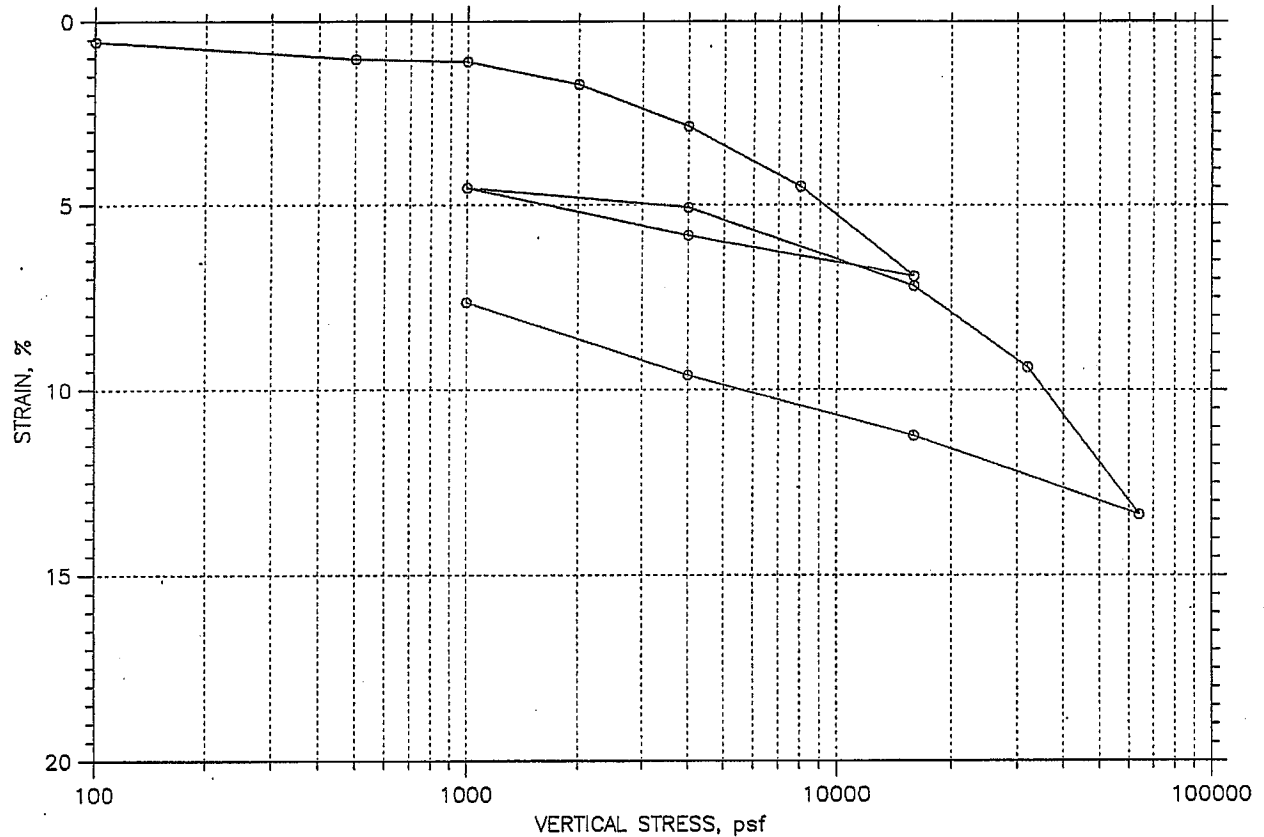


|                                          |        |                   |          | Before Test | After Test |
|------------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 3100 psf            |        |                   |          | 28.01       | 22.98      |
| Preconsolidation Pressure: 1.48e+004 psf |        |                   |          | 94.4        | 103.       |
| Compression Index: 0.189                 |        |                   |          | 97.66       | 99.10      |
| Diameter: 2.498 in                       |        | Height: 0.9978 in |          | 0.77        | 0.62       |
| LL: 67                                   | PL: 29 | PI: 38            | GS: 2.67 |             |            |

|  |                                                      |                          |                         |
|--|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                   | Location: B-2352UD       | Project No.: 6468071777 |
|  | Boring No.: B-2352UD                                 | Tested By: HJ            | Checked By: JW          |
|  | Sample No.: UD-5                                     | Test Date: 3/6/08        | Depth: 24-25.7'         |
|  | Test No.: 8363                                       | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Brownish Yellow Fat CLAY (CH)           |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          |                         |
|  | Cr= 0.010                                            |                          |                         |

Mon, 14-APR-2008 14:02:05

# CONSOLIDATION TEST DATA SUMMARY REPORT

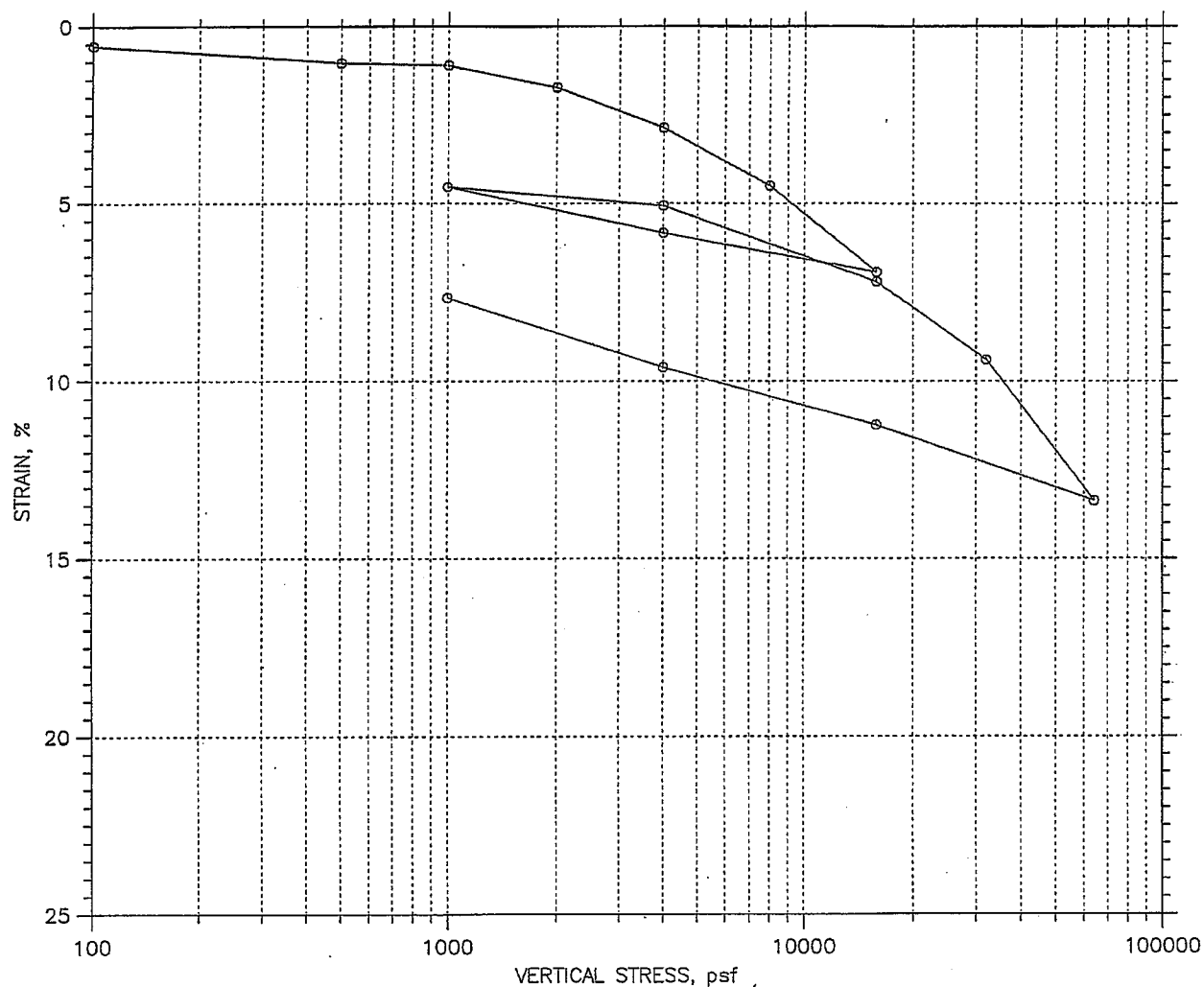


|                                |                                                               |                          |                                  |
|--------------------------------|---------------------------------------------------------------|--------------------------|----------------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                            | Location: B-2359UD UD-3  | Project No.: 6468071777          |
|                                | Boring No.: B-2359UD                                          | Tested By: BM            | Checked By: HJ <i>HJ</i>         |
|                                | Sample No.: UD-3                                              | Test Date: 3/28/08       | Depth: 30.8-32.8' <i>4/15/08</i> |
|                                | Test No.: 8558                                                | Sample Type: Undisturbed | Elevation: N/A                   |
|                                | Description: Light Gray Mottled Brownish Yellow Fat CLAY (CH) |                          |                                  |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04          |                          | Cr= 0.035                        |

KAW 4.15.08

Tue, 15-APR-2008 13:51:02

# CONSOLIDATION TEST DATA SUMMARY REPORT

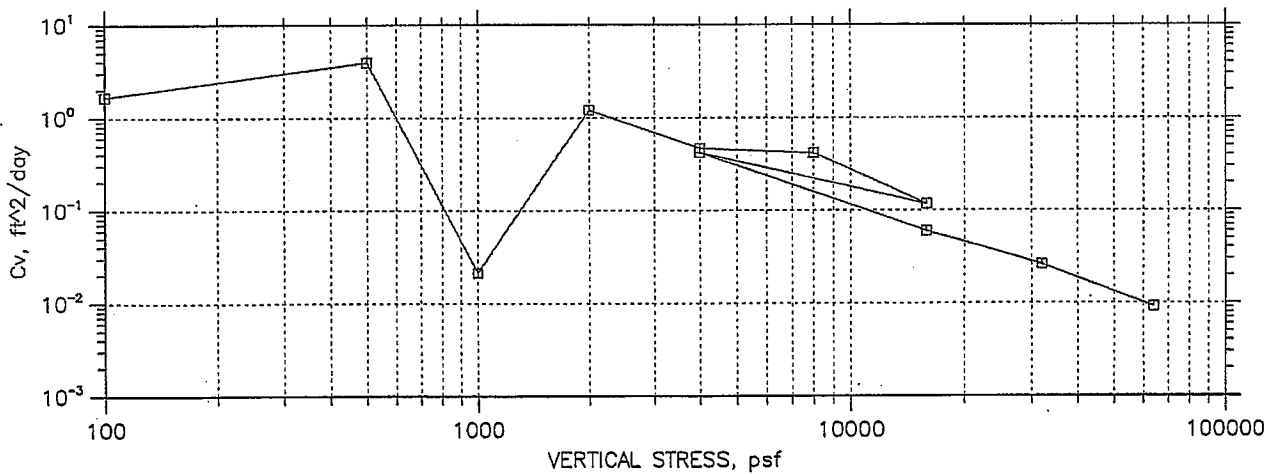
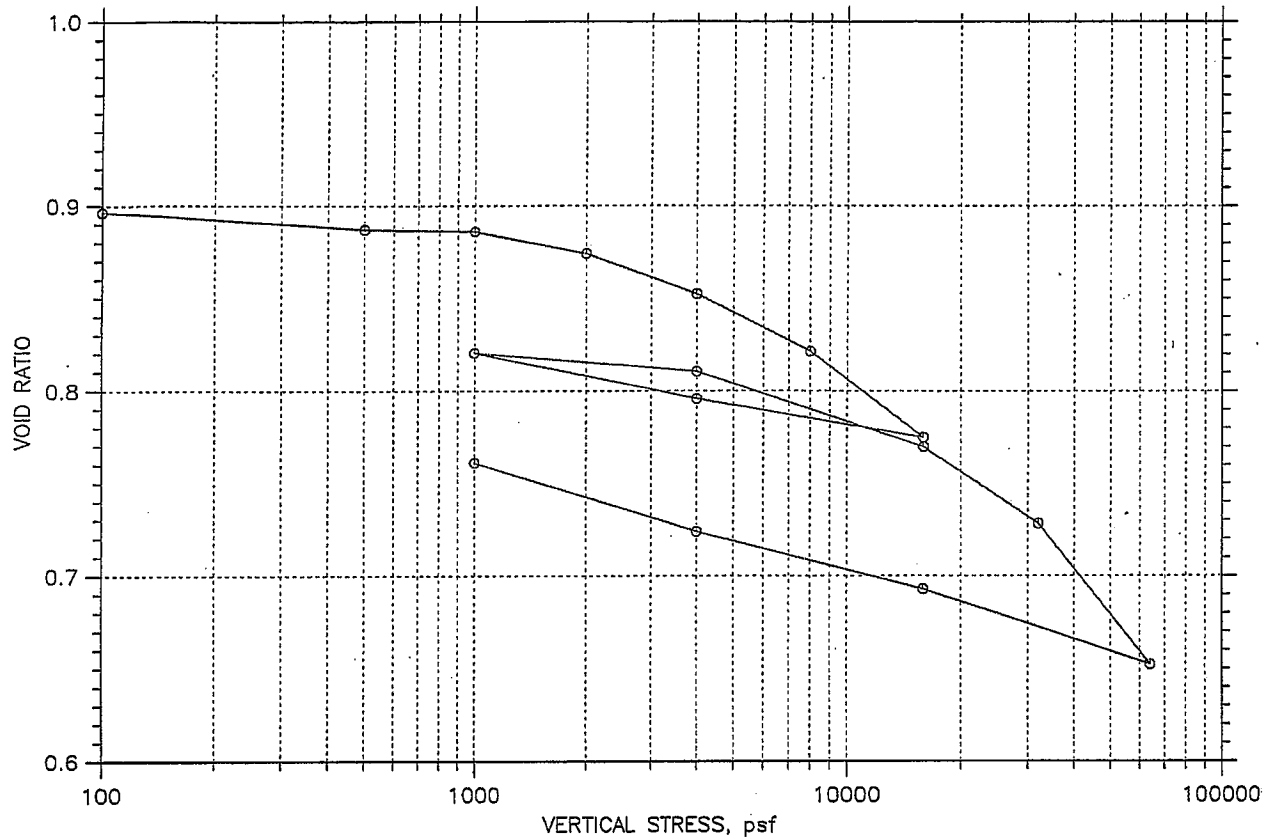


|                                          |                  |                      |          | Before Test | After Test |
|------------------------------------------|------------------|----------------------|----------|-------------|------------|
| Overburden Pressure: 4000 psf            |                  | Water Content, %     |          | 30.15       | 27.21      |
| Preconsolidation Pressure: 1.55e+004 psf |                  | Dry Unit Weight, pcf |          | 91.         | 98.55      |
| Compression Index: 0.252                 |                  | Saturation, %        |          | 92.39       | 99.40      |
| Diameter: 2.499 in                       | Height: 1.001 in | Void Ratio           |          | 0.91        | 0.76       |
| LL: 66                                   | PL: 30           | PI: 36               | GS: 2.78 |             |            |

|  |                                                               |  |                          |                         |
|--|---------------------------------------------------------------|--|--------------------------|-------------------------|
|  | Project: Exelon Texas COL Victoria                            |  | Location: B-2359UD UD-3  | Project No.: 6468071777 |
|  | Boring No.: B-2359UD                                          |  | Tested By: BM            | Checked By: HJ          |
|  | Sample No.: UD-3                                              |  | Test Date: 3/28/08       | Depth: 30.8-32.8'       |
|  | Test No.: 8558                                                |  | Sample Type: Undisturbed | Elevation: N/A          |
|  | Description: Light Gray Mottled Brownish Yellow Fat CLAY (CH) |  |                          |                         |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04          |  |                          |                         |
|  |                                                               |  |                          | Cr= 0.035               |

Tue, 15-APR-2008 13:51:02

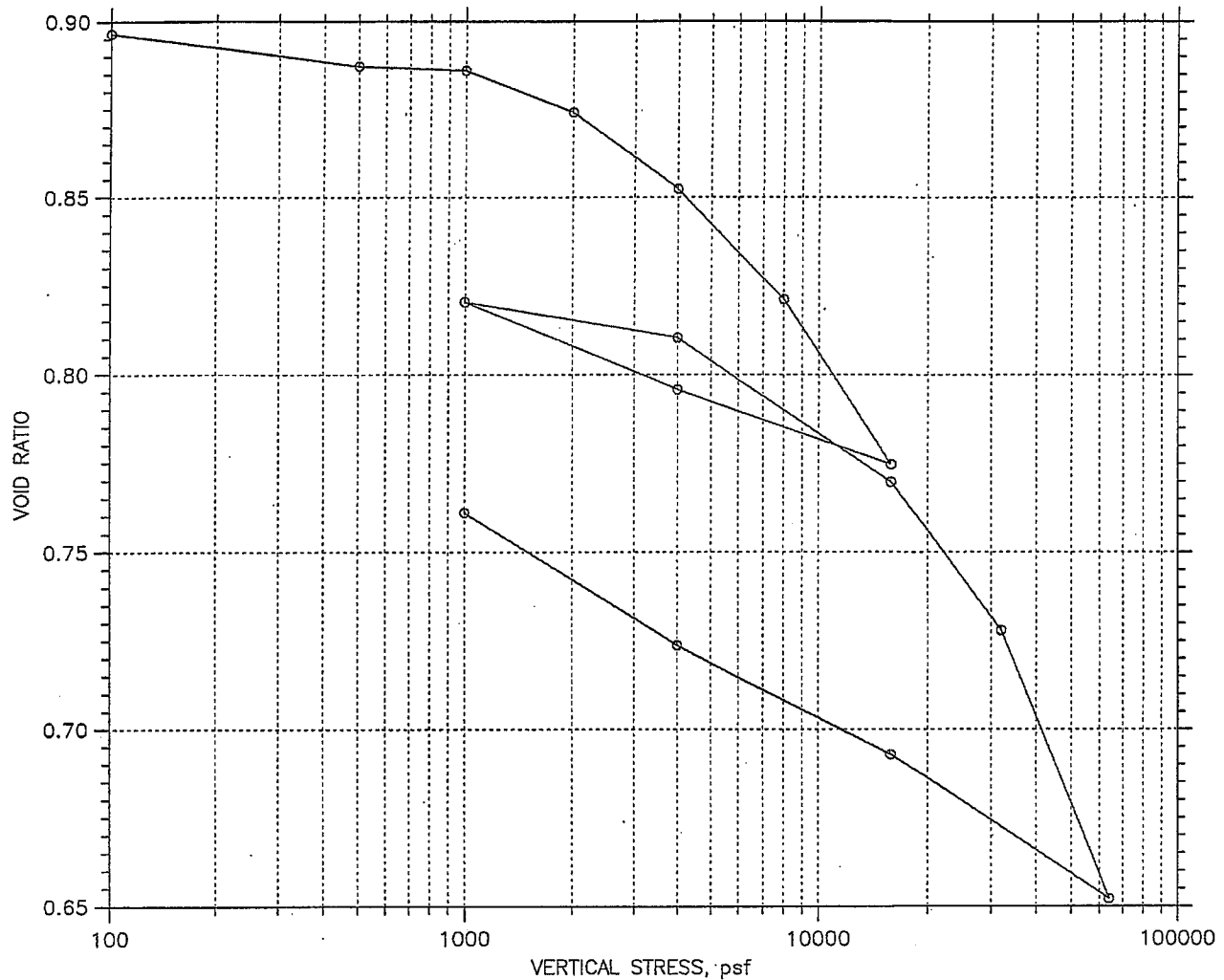
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                               |                          |                         |
|--------------------------------|---------------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                            | Location: B-2359UD UD-3  | Project No.: 6468071777 |
|                                | Boring No.: B-2359UD                                          | Tested By: BM            | Checked By: HJ          |
|                                | Sample No.: UD-3                                              | Test Date: 3/28/08       | Depth: 30.8-32.8'       |
|                                | Test No.: 8558                                                | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Light Gray Mottled Brownish Yellow Fat CLAY (CH) |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04          |                          | Cr= 0.035               |

Tue, 15-APR-2008 13:51:16

# CONSOLIDATION TEST DATA SUMMARY REPORT

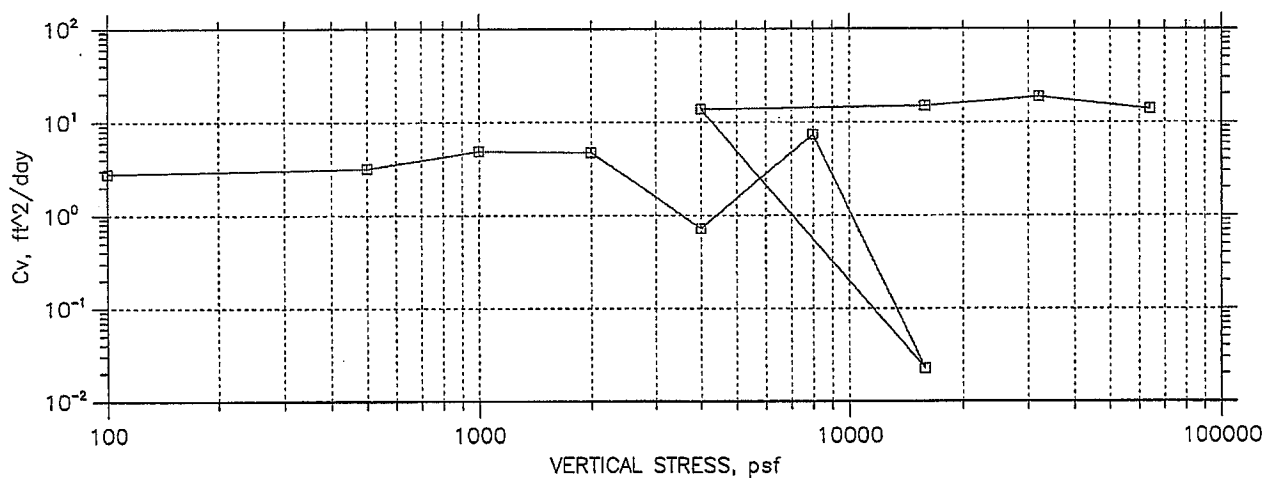
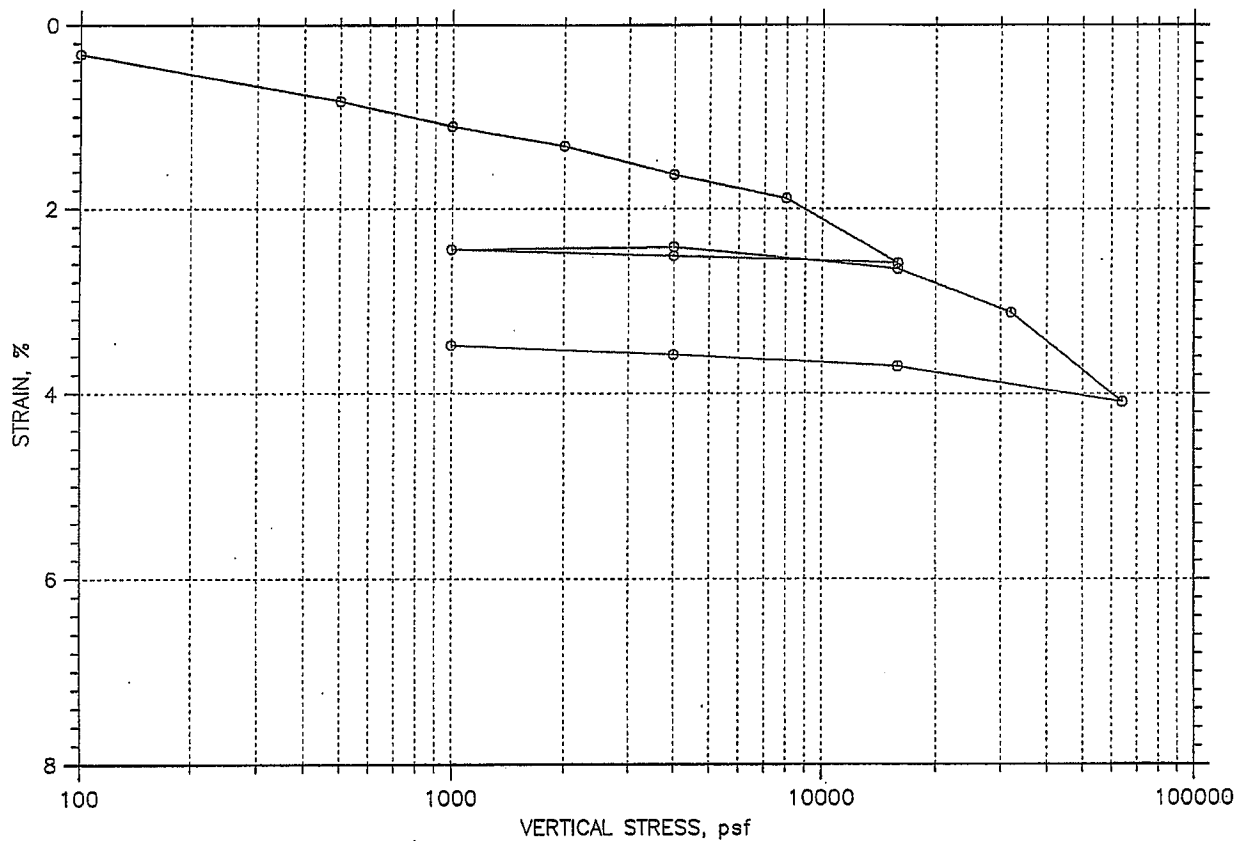


|                                          |                  |                      |          | Before Test | After Test |
|------------------------------------------|------------------|----------------------|----------|-------------|------------|
| Overburden Pressure: 4000 psf            |                  | Water Content, %     |          | 30.15       | 27.21      |
| Preconsolidation Pressure: 1.55e+004 psf |                  | Dry Unit Weight, pcf |          | 91.         | 98.55      |
| Compression Index: 0.252                 |                  | Saturation, %        |          | 92.39       | 99.40      |
| Diameter: 2.499 in                       | Height: 1.001 in | Void Ratio           |          | 0.91        | 0.76       |
| LL: 66                                   | PL: 30           | PI: 36               | GS: 2.78 |             |            |

|                                                      |                                                               |  |                          |                         |
|------------------------------------------------------|---------------------------------------------------------------|--|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria                            |  | Location: B-2359UD UD-3  | Project No.: 6468071777 |
|                                                      | Boring No.: B-2359UD                                          |  | Tested By: BM            | Checked By: HJ          |
|                                                      | Sample No.: UD-3                                              |  | Test Date: 3/28/08       | Depth: 30.8-32.8'       |
|                                                      | Test No.: 8558                                                |  | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Light Gray Mottled Brownish Yellow Fat CLAY (CH) |  |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                                               |  |                          | Cr= 0.035               |

Tue, 15-APR-2008 13:51:16

# CONSOLIDATION TEST DATA SUMMARY REPORT

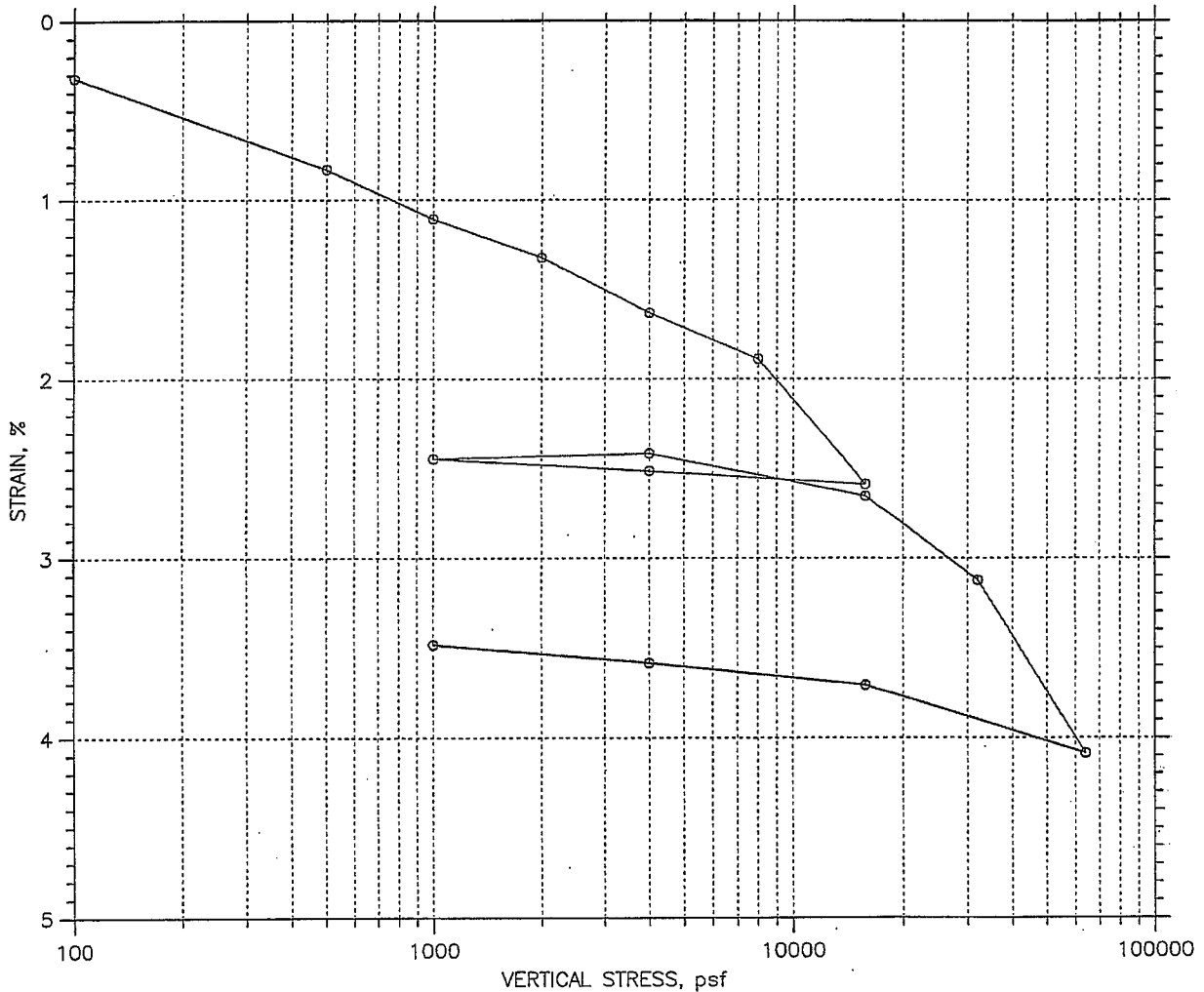


|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2359UD       | Project No.: 6468071777 |
|                                | Boring No.: B-2359UD                                 | Tested By: HJ            | Checked By: JW          |
|                                | Sample No.: UD-11                                    | Test Date: 3/5/08        | Depth: 77-78.7'         |
|                                | Test No.: 8366                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Light Gray Silty Clayey SAND (SC-SM)    |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          |                         |
|                                | Cr= 0.002                                            |                          |                         |

Mon, 14-APR-2008 14:20:25

KAW 4-15-08

# CONSOLIDATION TEST DATA SUMMARY REPORT



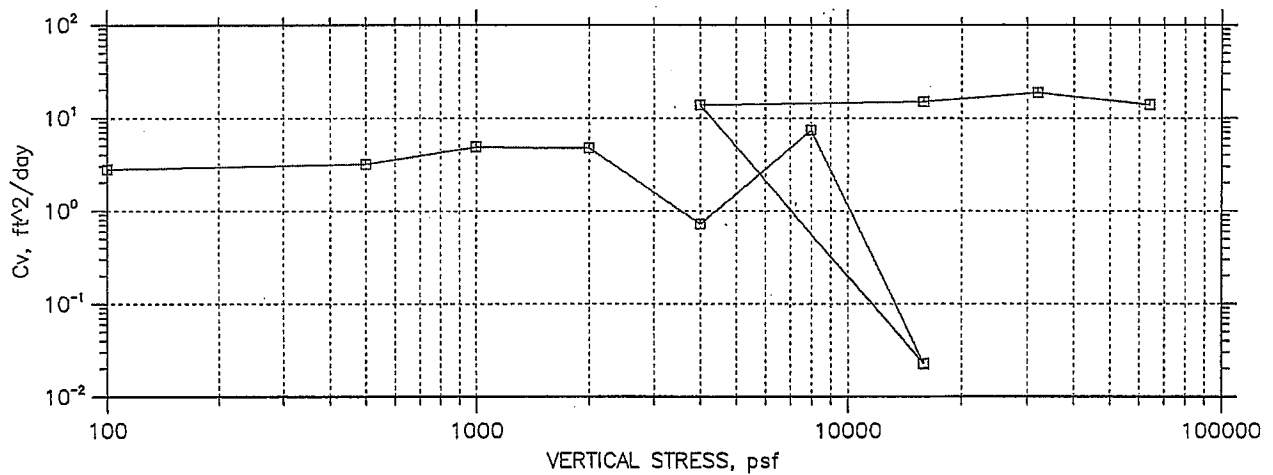
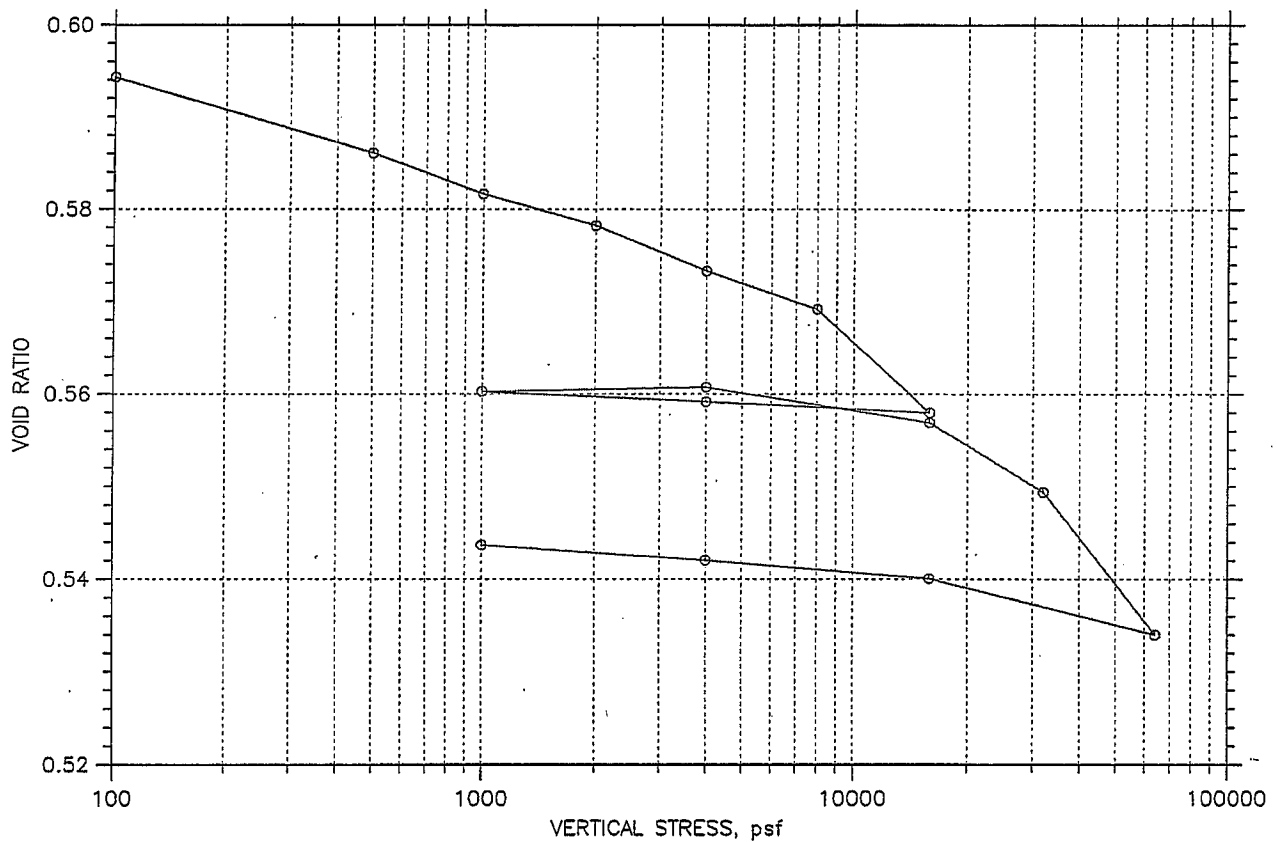
|                                          |        |                   |          | Before Test | After Test |
|------------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 8000 psf            |        |                   |          | 19.38       | 19.27      |
| Preconsolidation Pressure: 2.27e+004 psf |        |                   |          | 106.2       | 110.       |
| Compression Index: 0.05                  |        |                   |          | 87.97       | 96.43      |
| Diameter: 2.499 in                       |        | Height: 0.9975 in |          | 0.60        | 0.54       |
| LL: 23                                   | PL: 19 | PI: 4             | GS: 2.72 |             |            |

|  |                                                      |  |                          |                               |
|--|------------------------------------------------------|--|--------------------------|-------------------------------|
|  | Project: Exelon Texas COL Victoria                   |  | Location: B-2359UD       | Project No.: 6468071777       |
|  | Boring No.: B-2359UD                                 |  | Tested By: HJ            | Checked By: JW <i>JW</i>      |
|  | Sample No.: UD-11                                    |  | Test Date: 3/5/08        | Depth: 77-78.7'               |
|  | Test No.: 8366                                       |  | Sample Type: Undisturbed | Elevation: N/A <i>4/14/08</i> |
|  | Description: Light Gray Silty Clayey SAND (SC-SM)    |  |                          |                               |
|  | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          |                               |
|  |                                                      |  |                          | Cr= 0.002                     |

Mon, 14-APR-2008 14:20:25



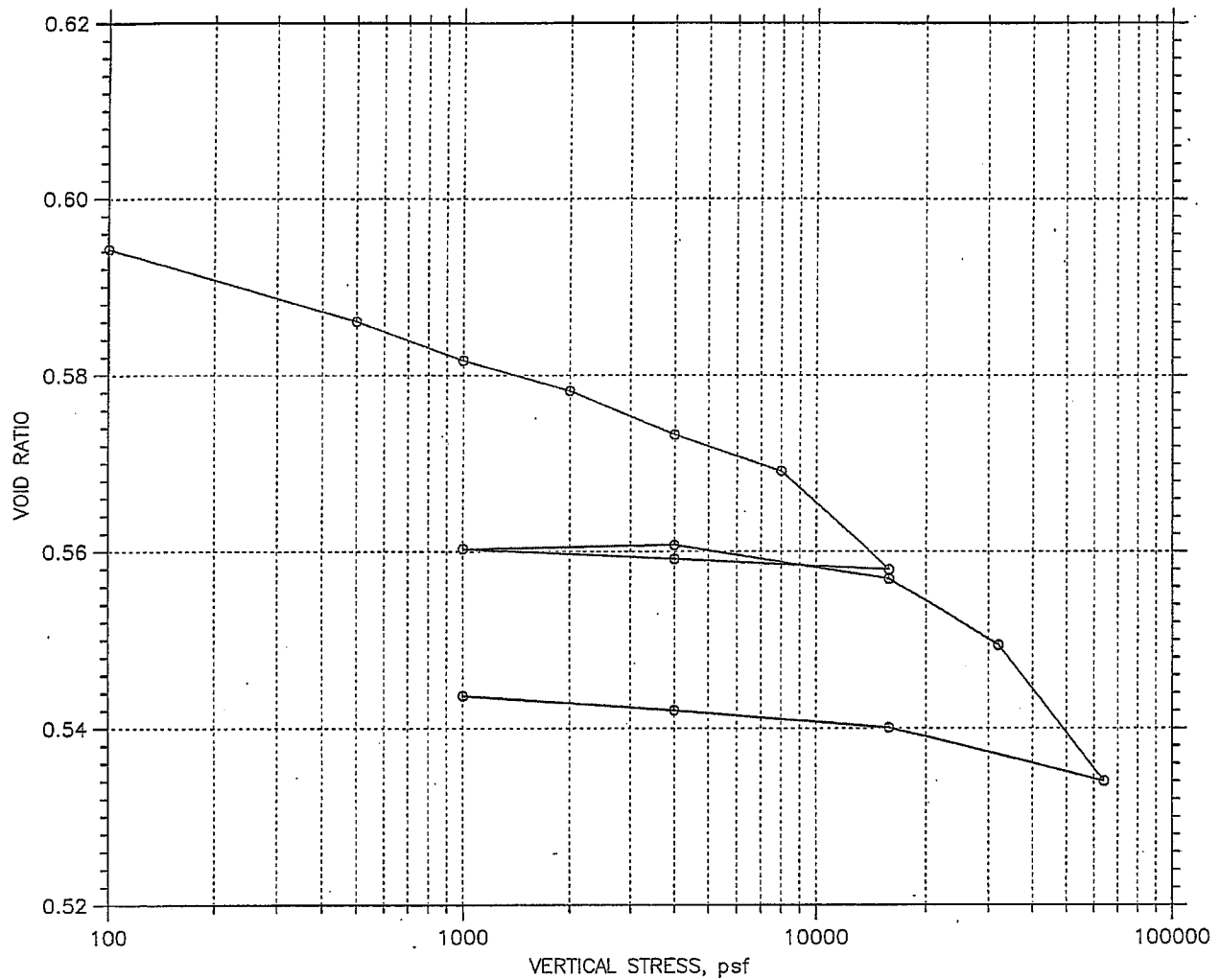
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                                         |                                                      |                          |                         |
|---------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div> <div></div> <div>MACTEC</div> </div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2359UD       | Project No.: 6468071777 |
|                                                         | Boring No.: B-2359UD                                 | Tested By: HJ            | Checked By: JW          |
|                                                         | Sample No.: UD-11                                    | Test Date: 3/5/08        | Depth: 77-78.7'         |
|                                                         | Test No.: 8366                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                                         | Description: Light Gray Silty Clayey SAND (SC-SM)    |                          |                         |
|                                                         | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.002               |

Mon, 14-APR-2008 14:20:33

# CONSOLIDATION TEST DATA SUMMARY REPORT

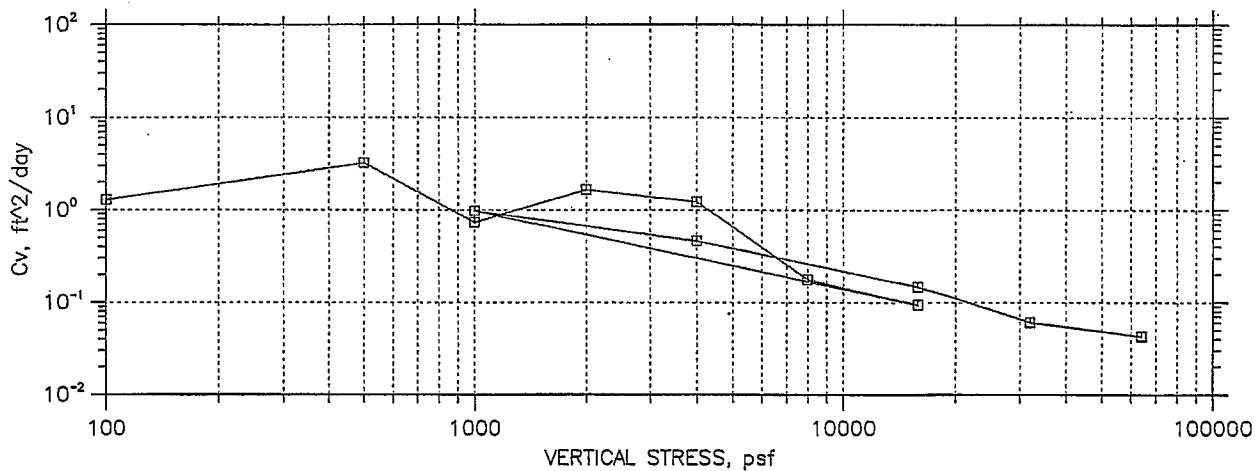
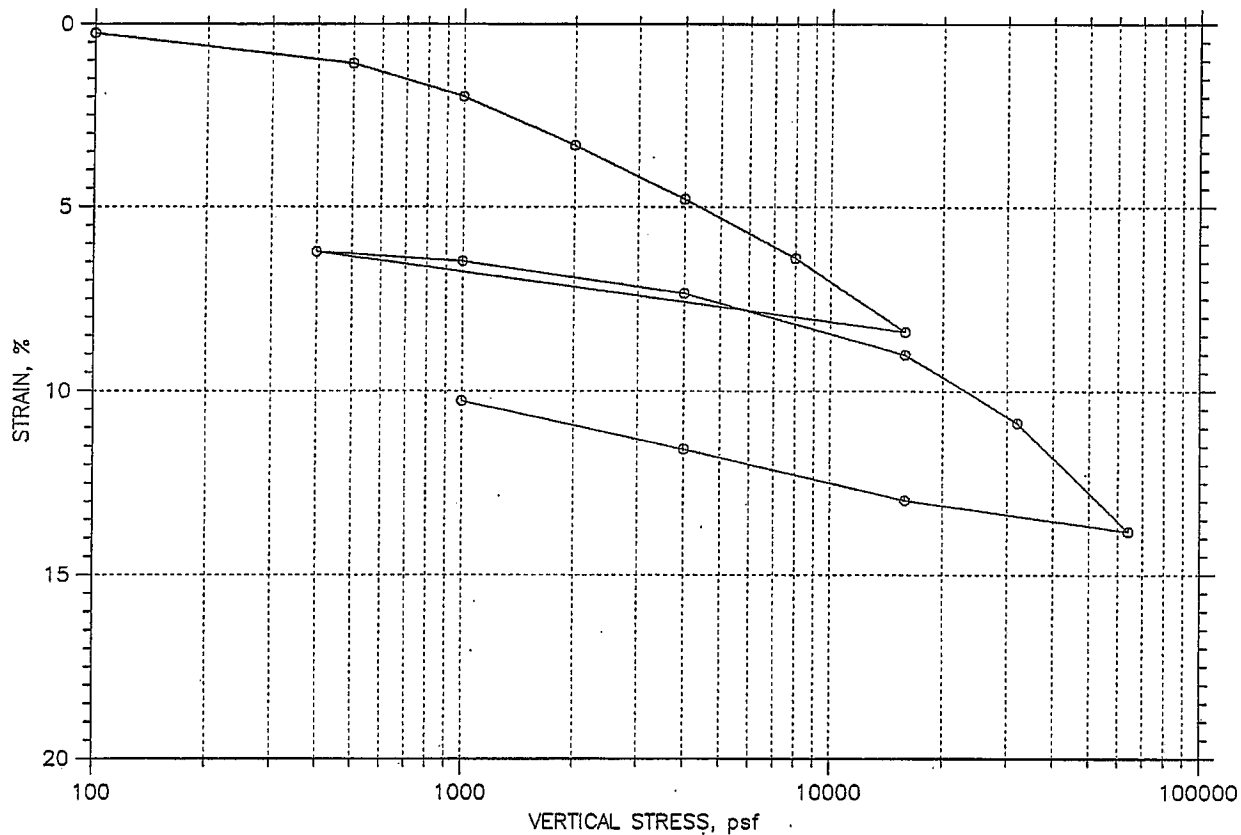


|                                          |        |                   |          | Before Test | After Test |
|------------------------------------------|--------|-------------------|----------|-------------|------------|
| Overburden Pressure: 8000 psf            |        |                   |          | 19.38       | 19.27      |
| Preconsolidation Pressure: 2.27e+004 psf |        |                   |          | 106.2       | 110.       |
| Compression Index: 0.05                  |        |                   |          | 87.97       | 96.43      |
| Diameter: 2.499 in                       |        | Height: 0.9975 in |          | 0.60        | 0.54       |
| LL: 23                                   | PL: 19 | PI: 4             | GS: 2.72 |             |            |

|               |                                                      |  |                          |                         |
|---------------|------------------------------------------------------|--|--------------------------|-------------------------|
| <b>MACTEC</b> | Project: Exelon Texas COL Victoria                   |  | Location: B-2359UD       | Project No.: 6468071777 |
|               | Boring No.: B-2359UD                                 |  | Tested By: HJ            | Checked By: JW          |
|               | Sample No.: UD-11                                    |  | Test Date: 3/5/08        | Depth: 77-78.7'         |
|               | Test No.: 8366                                       |  | Sample Type: Undisturbed | Elevation: N/A          |
|               | Description: Light Gray Silty Clayey SAND (SC-SM)    |  |                          |                         |
|               | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |  |                          |                         |
|               |                                                      |  |                          | Cr= 0.002               |

Mon, 14-APR-2008 14:20:33

# CONSOLIDATION TEST DATA SUMMARY REPORT

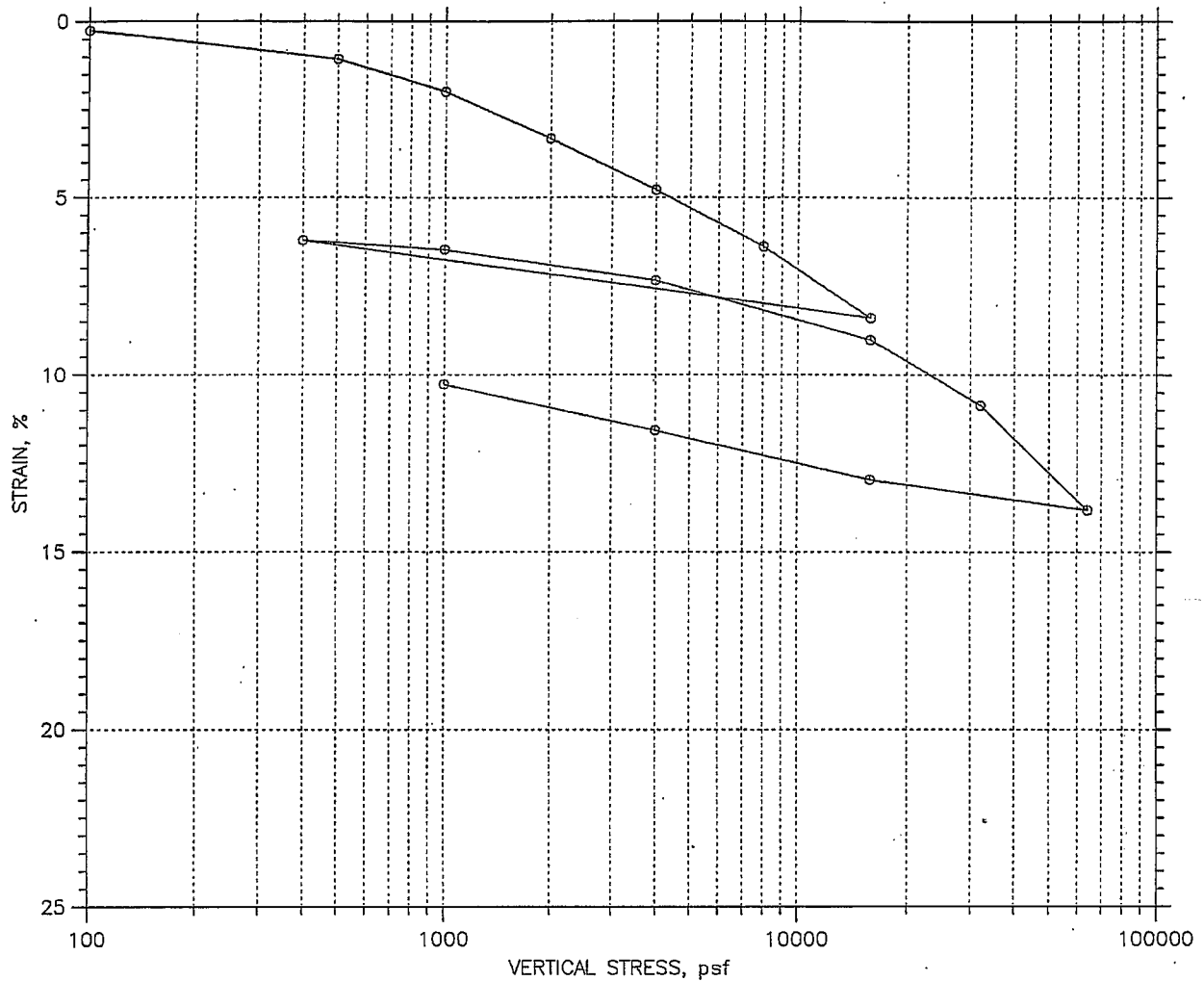


|        |                                                      |                          |                         |
|--------|------------------------------------------------------|--------------------------|-------------------------|
| MACTEC | Project: Exelon Texas COL Victoria                   | Location: B-2359UD       | Project No.: 6468071777 |
|        | Boring No.: B-2359UD                                 | Tested By: HJ            | Checked By: JW          |
|        | Sample No.: UD-18                                    | Test Date: 3/5/08        | Depth: 112-113.1'       |
|        | Test No.: 8369                                       | Sample Type: Undisturbed | Elevation: N/A          |
|        | Description: Yellowish Brown Clayey SAND (SC)        |                          |                         |
|        | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          |                         |
|        | Cr= 0.025                                            |                          |                         |

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KAW 4-15-08

# CONSOLIDATION TEST DATA SUMMARY REPORT

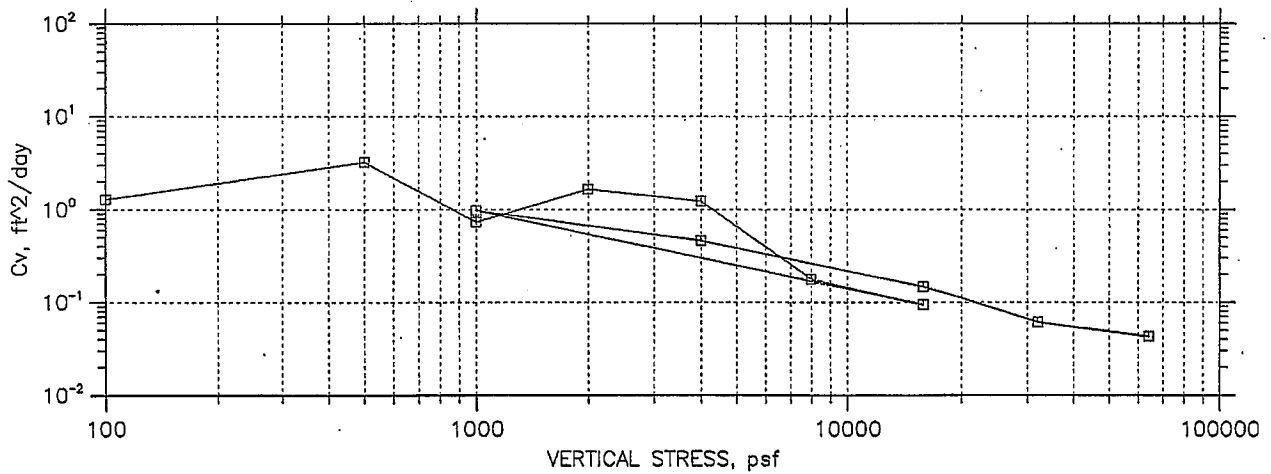
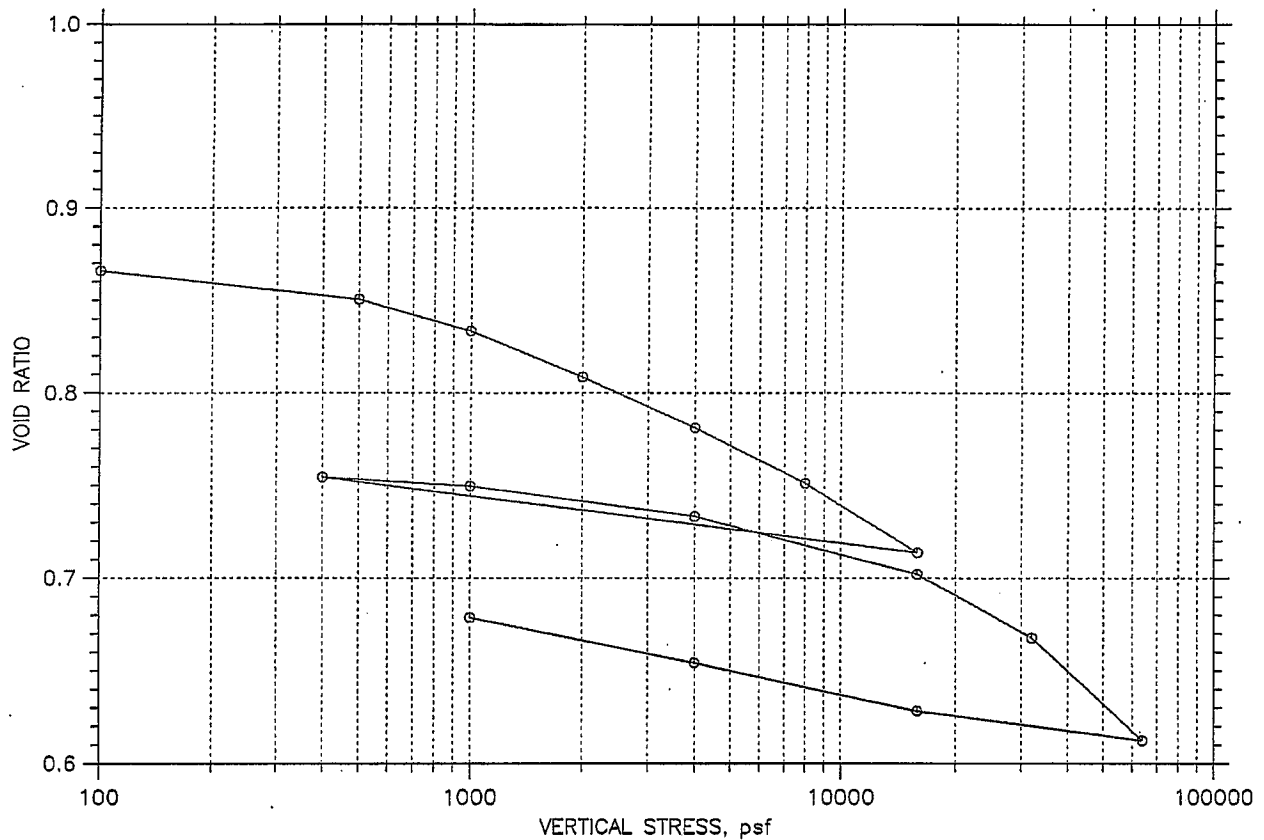


|                                          |                  |                      |          | Before Test | After Test |
|------------------------------------------|------------------|----------------------|----------|-------------|------------|
| Overburden Pressure: 1.02e+004 psf       |                  | Water Content, %     |          | 25.50       | 23.77      |
| Preconsolidation Pressure: 2.42e+004 psf |                  | Dry Unit Weight, pcf |          | 92.44       | 103.       |
| Compression Index: 0.186                 |                  | Saturation, %        |          | 81.12       | 97.01      |
| Diameter: 2.5 in                         | Height: 0.998 in | Void Ratio           |          | 0.87        | 0.68       |
| LL: 27                                   | PL: 15           | PI: 12               | GS: 2.77 |             |            |

|                                            |                                                      |                          |                         |
|--------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div></div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2359UD       | Project No.: 6468071777 |
|                                            | Boring No.: B-2359UD                                 | Tested By: HJ            | Checked By: JW          |
|                                            | Sample No.: UD-18                                    | Test Date: 3/5/08        | Depth: 112-113.1'       |
|                                            | Test No.: 8369                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                            | Description: Yellowish Brown Clayey SAND (SC)        |                          |                         |
|                                            | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.025               |

Mon, 14-APR-2008 14:20:55

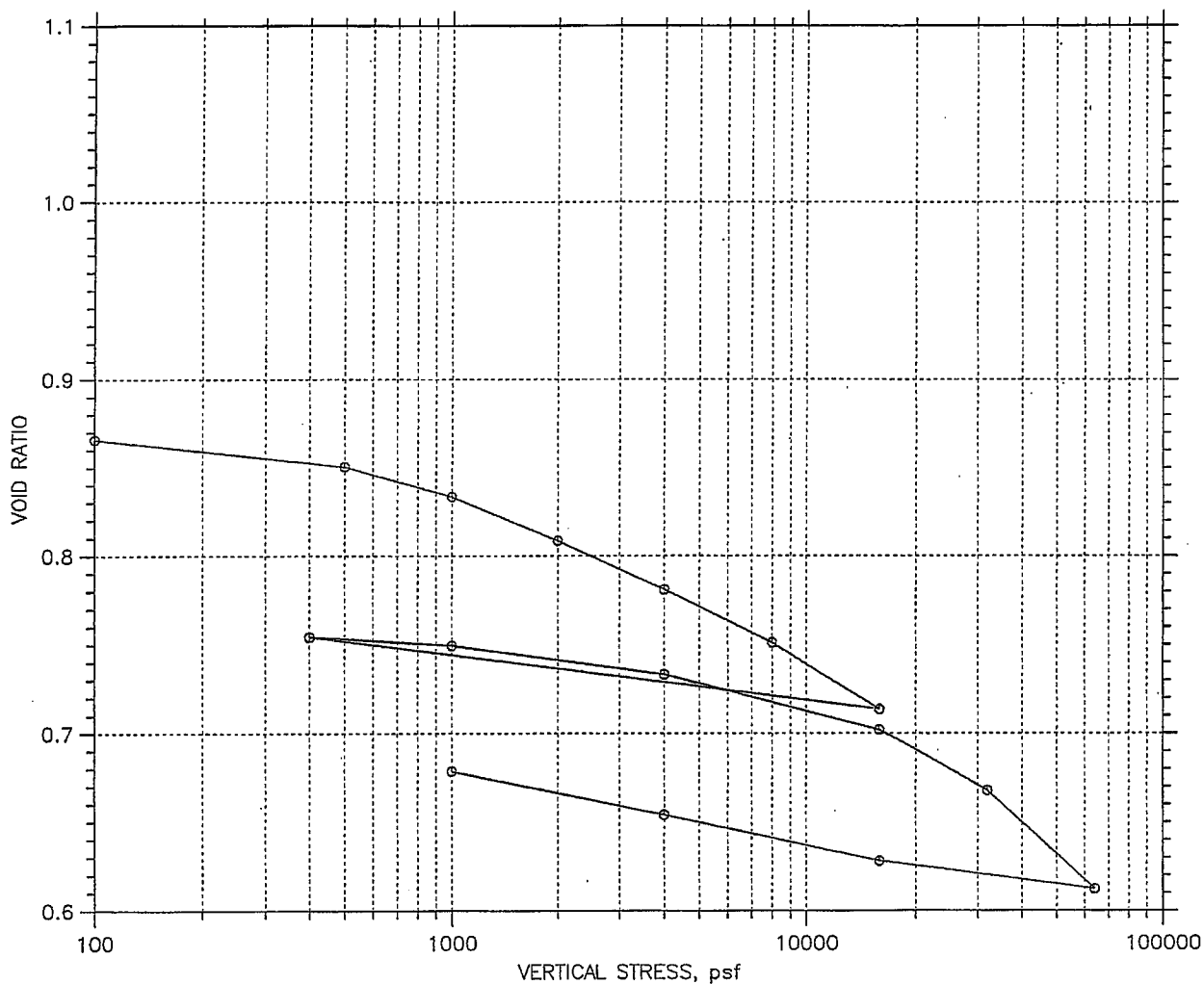
# CONSOLIDATION TEST DATA SUMMARY REPORT



|                                |                                                      |                          |                         |
|--------------------------------|------------------------------------------------------|--------------------------|-------------------------|
| <div> <div>MACTEC</div> </div> | Project: Exelon Texas COL Victoria                   | Location: B-2359UD       | Project No.: 6468071777 |
|                                | Boring No.: B-2359UD                                 | Tested By: HJ            | Checked By: JW          |
|                                | Sample No.: UD-18                                    | Test Date: 3/5/08        | Depth: 112-113.1'       |
|                                | Test No.: 8369                                       | Sample Type: Undisturbed | Elevation: N/A          |
|                                | Description: Yellowish Brown Clayey SAND (SC)        |                          |                         |
|                                | Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                          | Cr= 0.025               |

Mon, 14-APR-2008 14:21:02

# CONSOLIDATION TEST DATA SUMMARY REPORT

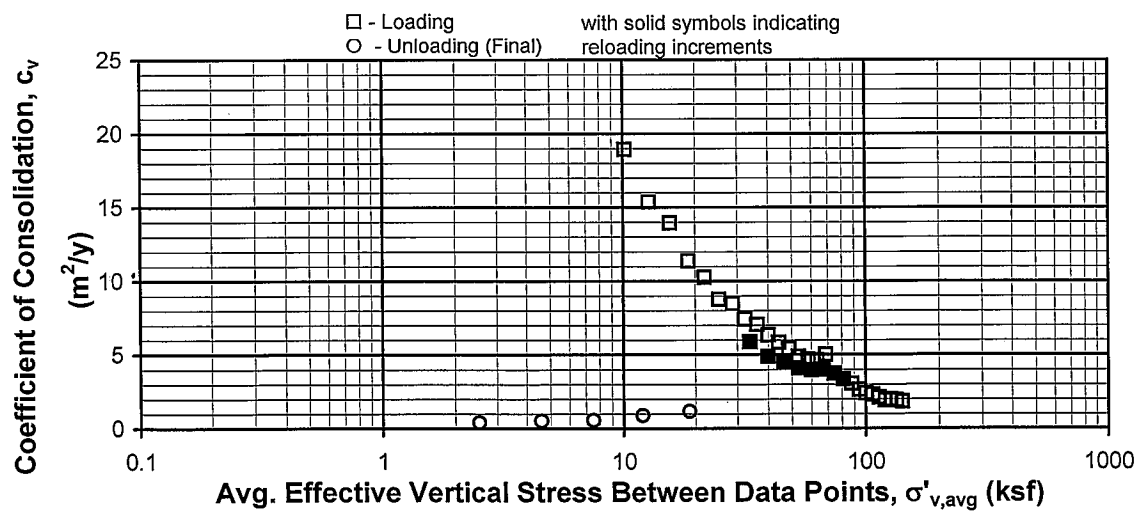
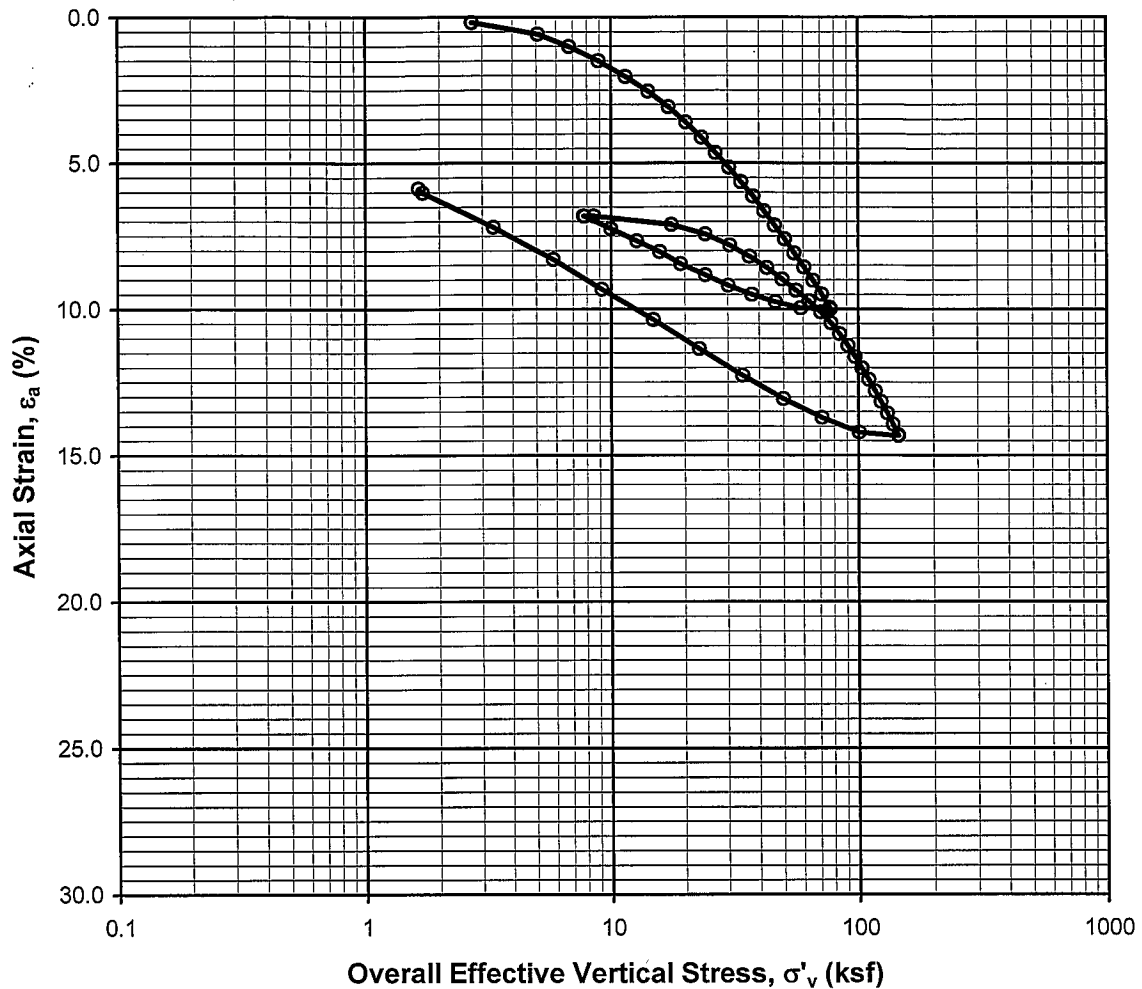


|                                          |        |                  |          | Before Test          | After Test |       |
|------------------------------------------|--------|------------------|----------|----------------------|------------|-------|
| Overburden Pressure: 1.02e+004 psf       |        |                  |          | Water Content, %     | 25.50      | 23.77 |
| Preconsolidation Pressure: 2.42e+004 psf |        |                  |          | Dry Unit Weight, pcf | 92.44      | 103.  |
| Compression Index: 0.186                 |        |                  |          | Saturation, %        | 81.12      | 97.01 |
| Diameter: 2.5 in                         |        | Height: 0.998 in |          | Void Ratio           | 0.87       | 0.68  |
| LL: 27                                   | PL: 15 | PI: 12           | GS: 2.77 |                      |            |       |

|                                                      |                                               |  |                          |                         |
|------------------------------------------------------|-----------------------------------------------|--|--------------------------|-------------------------|
|                                                      | Project: Exelon Texas COL Victoria            |  | Location: B-2359UD       | Project No.: 6468071777 |
|                                                      | Boring No.: B-2359UD                          |  | Tested By: HJ            | Checked By: JW          |
|                                                      | Sample No.: UD-18                             |  | Test Date: 3/5/08        | Depth: 112-113.1'       |
|                                                      | Test No.: 8369                                |  | Sample Type: Undisturbed | Elevation: N/A          |
|                                                      | Description: Yellowish Brown Clayey SAND (SC) |  |                          |                         |
| Remarks: CONSOLIDATION TEST REPORT By ASTM D 2435-04 |                                               |  |                          | Cr= 0.025               |

Mon, 14-APR-2008 14:21:02

# **Consolidation (Constant Rate of Strain) Tests**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-12A - Depth 78.5 - 80.5 ft  
 Boring B-2302UD





# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2302\_UD12a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.680 ☒ Meas. ; ☐ Assumed Ring No.: 8  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.686  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                          |                                           |                                        |                                           |                                  |                                           |                         |
|------------------------------------------|-------------------------------------------|----------------------------------------|-------------------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner         | <input type="checkbox"/> Remolded         | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2302UD                     | <input type="checkbox"/> LPC Core         | <input type="checkbox"/> Impact/Rammer | Rammer Wgt. (lbf) =                       | No. Layers =                     |                                           |                         |
| Sample No.: UD-12                        | Composited No.:                           | Pluviated:                             | Tamper Force (lbf) =                      | Drop (in.) =                     |                                           |                         |
| Depth (ft): 78.5 - 80.5                  | Specimen No.: A                           | Kneading                               | <input type="checkbox"/> Undercompaction: | $U_{ni}$ (%) =                   | Dia. (in.) =                              |                         |
| Spec. Selection by X-ray;                | <input type="checkbox"/> Geomarine Sample |                                        | Ref. Effort =                             | % Comp. =                        | ± Opt. =                                  |                         |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 |        | Initial | Final |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------------------------|--------------------------------|------------------------------------------------------|--------|---------|-------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                  |                                | Mass Moist Soil + Ring (g)                           |        |         |       |
| Container No.                                            | 811                         | 2016             | 2033                                        | 893                            | Mass Ring (g)                                        | 214.27 |         |       |
| Mass Moist Soil + Container (g)                          | 123.55                      | 137.51           | 80.29                                       | 65.09                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 119.74 | 118.70  |       |
| Mass Dry Soil + Container (g)                            | 107.80                      | 120.05           | 71.29                                       | 59.25                          | EXCESS DRY SOIL (soil not incl. in final mass above) |        |         |       |
| Mass Container (g)                                       | 32.06                       | 30.70            | 30.91                                       | 32.27                          | Container No.                                        | 5042   |         |       |
| WATER CONTENT (%)                                        | 20.79                       | 19.54            | 22.29                                       | 21.65                          | Mass Dry Soil + Container (g)                        | 31.14  |         |       |
| Avg. Initial Water Content, $W_4$ (%)                    | 20.87                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> Slice ; | Whole Spec.                    | Mass Container (g)                                   | 30.97  |         |       |
| See attached data sheet(s) for additional water contents |                             |                  |                                             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.17   |         |       |

| Soil Height: Measurements (mm)                                                                                                                                               |                                                                       |                                                                       |                                                                       | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                                                       | Final                                                                 |                                                                       | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 19.050 |
| with Spec.                                                                                                                                                                   | without Spec.                                                         | with Spec.                                                            | without Spec.                                                         | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 19.230                                                                                                                                                                       | 0.000                                                                 | 12.160                                                                | 13.040                                                                | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 19.218  | 12.114 |
| 19.210                                                                                                                                                                       | 0.000                                                                 | 12.090                                                                | 12.940                                                                | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 12.986 |
| 19.220                                                                                                                                                                       | 0.000                                                                 | 12.120                                                                | 12.970                                                                | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 19.218  | 18.178 |
| 19.210                                                                                                                                                                       | 0.000                                                                 | 12.110                                                                | 12.990                                                                | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 19.220                                                                                                                                                                       | 0.000                                                                 | 12.090                                                                | 12.990                                                                | Initial Height, $H_o$                                   |                                                                     | 19.218  |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,t}$ | 1.128   |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,t}$           | 18.090  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                                                       |                                                                       |                                                                       | Final Soil Height Measurement, $H_{f,m}$                |                                                                     | 18.178  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                                                       |                                                                       |                                                                       | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |                                                                     | -0.46   |        |

| Estimated Initial Unit Weight                                                                         |                                    | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 122.76                                                                  | Dry, $\gamma_{d,o}$ (pcf) = 101.56 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |                                    | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Gray Fat CLAY with sand (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 4/1/2008 Date: 4/1/2008 Final Calc. By: LF Date: 4/5/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2302\_UD12a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.680 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 20.79                    | 99.13                    | 86.6                         | 95.4                  | 96.8  |
| 2                | " Bottom, W2          | 19.54                    | 100.17                   | 83.6                         | 92.1                  | 93.4  |
| 3                | " Sides, W3           | 22.29                    | 97.92                    | 90.0                         | 99.2                  | 100.5 |
| 4                | " Average, W4         | 20.87                    | 99.06                    | 86.8                         | 95.6                  | 97.0  |
| 5                | " Back Calculated (1) | 22.50                    | 97.75 (3)                | 90.5                         | 99.7                  | 101.0 |
| 6                | Final                 | 21.65                    | 97.75 (2)                | 90.5                         | 99.7                  | 101.0 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. 5                                                                                     | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = 2.675                                                                                     |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.677                                                     |                                |

|                                                      |         |
|------------------------------------------------------|---------|
| Calculation Constant, K                              |         |
| = (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_s$                                     | 0.11797 |
| Final Selected, $K_f$                                | 0.11797 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 97.64                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 97.69                                                 |  |                              |

| Summary of Specimen Physical Properties |                      |               |                             |                                     |                                                                |                                                  |                                                                        |                                            |  |
|-----------------------------------------|----------------------|---------------|-----------------------------|-------------------------------------|----------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------|--|
| Specific Gravity<br>$G_s = 2.680$       |                      |               | Assumed                     |                                     | To make $S_f = 100\%$ at end of test.                          |                                                  |                                                                        |                                            |  |
|                                         |                      | X             | Measured                    |                                     | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_f = 100\%$ |                                                  |                                                                        |                                            |  |
| Mass Dry Soil, (g)                      | Initial: 97.75       |               | X                           | From Cal. Routine No. 5             |                                                                | Note: Routine #5 is based on final measurements. |                                                                        |                                            |  |
|                                         | Final (4): NA        |               |                             | Make $S_f = 100\%$ , or;            |                                                                | Avg. of measured & make $S_f = 100\%$            |                                                                        |                                            |  |
| Initial Height (mm) =                   |                      |               | 19.22                       | X                                   | Measured ;                                                     |                                                  |                                                                        | Back Calculated Back-cal. Sat. (%) = NA    |  |
| Final Height (mm) =                     |                      |               | 18.18                       | X                                   | Measured ;                                                     |                                                  |                                                                        | Initial $H_o$ & dial change during loading |  |
|                                         | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                              | Height of Solids, $H_s$ (2,4) (mm)               | Extruded soil loss proportioned in increasing loading increments (5) : |                                            |  |
| Initial                                 | 22.5                 | 0.667         | 90.5                        | 122.8                               | 100.2                                                          | 11.532                                           | From                                                                   | To (ksf)                                   |  |
| Final                                   | 21.4                 | 0.576         | 99.7                        | 128.7                               | 105.9                                                          | NA                                               | NA                                                                     | NA                                         |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 64 | Minus 200 (%) |
| Casagrande Method      | 28.20             | NA                                | 0.163 | 0.036 | 3.5 | Plastic Limit (PL)    | 21 | 83.0          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 43 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP HP

Date: 4/7/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2302\_UD12a  
 Task No.: NA Date; Start: 4/1/2008 Initial Height,  $H_o$  (mm): 19.22  
 Project Name: Exelon (Victoria) Completed: 4/5/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6861  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.97216,  $V$ : 0.023539169 Piston Uplift,  $P_{up}$  (lbf): 34.87  
 Back Pressure,  $U_{b, CS}$  (psi): 70.96606,  $V$ : 0.023537141 Setup  $DT_{ref}$  (V): 0.002111251  
 Displacement Transducer No.: DT-108 Calib. Factor (mm/V): 227.98906 Ch. No.: 2  
 Pore Press. Transducer No.: PT-116 Calib. Factor (psi/V): 3007.15024 Ref. Zero (V): -0.000062 Ch. No.: 3  
 Force Cell No.: FT-108 Calib. Factor (lbf/V): -156066.76 Ref. Zero (V): -0.000006 Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>$n$ & $n-1$ ,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| S                            | 92                    | 16 : 59 : 09         |                                                                    | 0.40                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                   |
| BS                           | 92                    | 19 : 24 : 16         |                                                                    | 2.83                                                        |                                                            | 0.040                                                         | 0.000                                                                 | 0.040                                                                   |                                                                                   |
| BE                           | 93                    | 09 : 22 : 19         |                                                                    | 2.73                                                        | 0.001                                                      | 0.035                                                         | 0.000                                                                 | 0.035                                                                   |                                                                                   |
| CS                           | 93                    | 09 : 22 : 24         | 0                                                                  | 2.72                                                        | 0.000                                                      | 0.034                                                         | 0.000                                                                 | 0.034                                                                   |                                                                                   |
|                              | 93                    | 10 : 00 : 07         | 38                                                                 | 5.20                                                        | 0.174                                                      | 0.111                                                         | 0.000                                                                 | 0.111                                                                   | 0.634                                                                             |
|                              | 93                    | 10 : 38 : 10         | 76                                                                 | 6.95                                                        | 0.255                                                      | 0.194                                                         | 0.000                                                                 | 0.194                                                                   | 0.688                                                                             |
| US                           | 93                    | 11 : 23 : 12         | 121                                                                | 9.10                                                        | 0.239                                                      | 0.288                                                         | 0.000                                                                 | 0.288                                                                   | 0.652                                                                             |
|                              | 93                    | 12 : 08 : 14         | 166                                                                | 11.71                                                       | 0.330                                                      | 0.390                                                         | 0.000                                                                 | 0.390                                                                   | 0.702                                                                             |
|                              | 93                    | 12 : 53 : 16         | 211                                                                | 14.43                                                       | 0.390                                                      | 0.488                                                         | 0.000                                                                 | 0.488                                                                   | 0.681                                                                             |
|                              | 93                    | 13 : 38 : 19         | 256                                                                | 17.51                                                       | 0.500                                                      | 0.590                                                         | 0.000                                                                 | 0.590                                                                   | 0.706                                                                             |
|                              | 93                    | 14 : 23 : 21         | 301                                                                | 20.61                                                       | 0.586                                                      | 0.690                                                         | 0.000                                                                 | 0.690                                                                   | 0.696                                                                             |
|                              | 93                    | 15 : 08 : 23         | 346                                                                | 23.99                                                       | 0.712                                                      | 0.793                                                         | 0.000                                                                 | 0.793                                                                   | 0.712                                                                             |
|                              | 93                    | 15 : 53 : 26         | 391                                                                | 27.35                                                       | 0.780                                                      | 0.892                                                         | 0.000                                                                 | 0.892                                                                   | 0.689                                                                             |
|                              | 93                    | 16 : 38 : 28         | 436                                                                | 31.03                                                       | 0.887                                                      | 0.989                                                         | 0.000                                                                 | 0.989                                                                   | 0.667                                                                             |
|                              | 93                    | 17 : 23 : 30         | 481                                                                | 34.71                                                       | 1.003                                                      | 1.085                                                         | 0.000                                                                 | 1.085                                                                   | 0.666                                                                             |
|                              | 93                    | 18 : 08 : 32         | 526                                                                | 38.73                                                       | 1.141                                                      | 1.179                                                         | 0.000                                                                 | 1.179                                                                   | 0.656                                                                             |
|                              | 93                    | 18 : 53 : 35         | 571                                                                | 42.83                                                       | 1.277                                                      | 1.275                                                         | 0.000                                                                 | 1.275                                                                   | 0.661                                                                             |
|                              | 93                    | 19 : 38 : 36         | 616                                                                | 47.20                                                       | 1.479                                                      | 1.369                                                         | 0.000                                                                 | 1.369                                                                   | 0.653                                                                             |
|                              | 93                    | 20 : 23 : 39         | 661                                                                | 51.88                                                       | 1.662                                                      | 1.461                                                         | 0.000                                                                 | 1.461                                                                   | 0.635                                                                             |
|                              | 93                    | 21 : 08 : 41         | 706                                                                | 56.71                                                       | 1.910                                                      | 1.553                                                         | 0.000                                                                 | 1.553                                                                   | 0.639                                                                             |
|                              | 93                    | 21 : 53 : 43         | 751                                                                | 61.91                                                       | 2.052                                                      | 1.646                                                         | 0.000                                                                 | 1.646                                                                   | 0.644                                                                             |
|                              | 93                    | 22 : 38 : 46         | 796                                                                | 67.12                                                       | 1.935                                                      | 1.733                                                         | 0.000                                                                 | 1.733                                                                   | 0.609                                                                             |
| UE                           | 93                    | 23 : 23 : 49         | 841                                                                | 72.60                                                       | 1.899                                                      | 1.823                                                         | 0.000                                                                 | 1.823                                                                   | 0.622                                                                             |
|                              | 94                    | 00 : 08 : 52         | 886                                                                | 78.45                                                       | 2.220                                                      | 1.911                                                         | 0.000                                                                 | 1.911                                                                   | 0.609                                                                             |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                              | 94                    | 00 : 12 : 08         | 890                                                                | 79.03                                                       | 2.244                                                      | 1.920                                                         | 0.000                                                                 | 1.920                                                                   | 0.844                                                                           |
|                              | 94                    | 00 : 12 : 37         | 890                                                                | 78.87                                                       | 2.241                                                      | 1.922                                                         | 0.000                                                                 | 1.922                                                                   | 1.565                                                                           |
|                              | 94                    | 01 : 27 : 40         | 965                                                                | 58.73                                                       | -0.180                                                     | 1.914                                                         | 0.000                                                                 | 1.914                                                                   | -0.032                                                                          |
|                              | 94                    | 02 : 42 : 44         | 1040                                                               | 46.13                                                       | -0.634                                                     | 1.875                                                         | 0.000                                                                 | 1.875                                                                   | -0.165                                                                          |
|                              | 94                    | 03 : 57 : 47         | 1115                                                               | 36.99                                                       | -0.905                                                     | 1.825                                                         | 0.000                                                                 | 1.825                                                                   | -0.207                                                                          |
|                              | 94                    | 05 : 12 : 52         | 1190                                                               | 29.49                                                       | -1.075                                                     | 1.766                                                         | 0.000                                                                 | 1.766                                                                   | -0.245                                                                          |
| US                           | 94                    | 06 : 27 : 57         | 1266                                                               | 23.53                                                       | -1.140                                                     | 1.699                                                         | 0.000                                                                 | 1.699                                                                   | -0.281                                                                          |
|                              | 94                    | 07 : 43 : 01         | 1341                                                               | 18.46                                                       | -1.187                                                     | 1.625                                                         | 0.000                                                                 | 1.625                                                                   | -0.308                                                                          |
|                              | 94                    | 08 : 58 : 04         | 1416                                                               | 15.00                                                       | -1.189                                                     | 1.545                                                         | 0.000                                                                 | 1.545                                                                   | -0.331                                                                          |
|                              | 94                    | 10 : 13 : 07         | 1491                                                               | 11.98                                                       | -1.172                                                     | 1.473                                                         | 0.000                                                                 | 1.473                                                                   | -0.298                                                                          |
|                              | 94                    | 11 : 28 : 10         | 1566                                                               | 9.20                                                        | -1.219                                                     | 1.394                                                         | 0.000                                                                 | 1.394                                                                   | -0.331                                                                          |
| UE                           | 94                    | 12 : 43 : 14         | 1641                                                               | 7.03                                                        | -1.218                                                     | 1.310                                                         | 0.000                                                                 | 1.310                                                                   | -0.347                                                                          |
|                              | 94                    | 12 : 44 : 04         | 1642                                                               | 6.97                                                        | -1.219                                                     | 1.309                                                         | 0.000                                                                 | 1.309                                                                   | -0.421                                                                          |
|                              | 94                    | 12 : 46 : 59         | 1645                                                               | 7.82                                                        | -1.113                                                     | 1.309                                                         | 0.000                                                                 | 1.309                                                                   | -0.037                                                                          |
|                              | 94                    | 13 : 28 : 16         | 1686                                                               | 18.11                                                       | 0.730                                                      | 1.366                                                         | 0.000                                                                 | 1.366                                                                   | 0.430                                                                           |
|                              | 94                    | 14 : 09 : 33         | 1727                                                               | 25.24                                                       | 1.392                                                      | 1.429                                                         | 0.000                                                                 | 1.429                                                                   | 0.482                                                                           |
| US                           | 94                    | 14 : 50 : 51         | 1768                                                               | 31.90                                                       | 1.902                                                      | 1.502                                                         | 0.000                                                                 | 1.502                                                                   | 0.547                                                                           |
|                              | 94                    | 15 : 32 : 08         | 1810                                                               | 38.38                                                       | 2.359                                                      | 1.576                                                         | 0.000                                                                 | 1.576                                                                   | 0.562                                                                           |
|                              | 94                    | 16 : 13 : 26         | 1851                                                               | 44.86                                                       | 2.739                                                      | 1.649                                                         | 0.000                                                                 | 1.649                                                                   | 0.554                                                                           |
|                              | 94                    | 16 : 54 : 43         | 1892                                                               | 51.69                                                       | 3.059                                                      | 1.725                                                         | 0.000                                                                 | 1.725                                                                   | 0.573                                                                           |
|                              | 94                    | 17 : 36 : 00         | 1934                                                               | 58.58                                                       | 3.278                                                      | 1.798                                                         | 0.000                                                                 | 1.798                                                                   | 0.550                                                                           |
|                              | 94                    | 18 : 17 : 18         | 1975                                                               | 65.66                                                       | 3.419                                                      | 1.868                                                         | 0.000                                                                 | 1.868                                                                   | 0.527                                                                           |
|                              | 94                    | 18 : 58 : 35         | 2016                                                               | 73.08                                                       | 3.494                                                      | 1.941                                                         | 0.000                                                                 | 1.941                                                                   | 0.558                                                                           |
|                              | 94                    | 19 : 39 : 53         | 2057                                                               | 80.24                                                       | 3.618                                                      | 2.014                                                         | 0.000                                                                 | 2.014                                                                   | 0.548                                                                           |
|                              | 94                    | 20 : 21 : 10         | 2099                                                               | 87.06                                                       | 3.888                                                      | 2.085                                                         | 0.000                                                                 | 2.085                                                                   | 0.538                                                                           |
|                              | 94                    | 21 : 02 : 27         | 2140                                                               | 93.93                                                       | 4.318                                                      | 2.162                                                         | 0.000                                                                 | 2.162                                                                   | 0.582                                                                           |
|                              | 94                    | 21 : 43 : 44         | 2181                                                               | 100.53                                                      | 4.757                                                      | 2.236                                                         | 0.000                                                                 | 2.236                                                                   | 0.559                                                                           |
|                              | 94                    | 22 : 25 : 01         | 2223                                                               | 107.15                                                      | 5.171                                                      | 2.308                                                         | 0.000                                                                 | 2.308                                                                   | 0.546                                                                           |
|                              | 94                    | 23 : 06 : 18         | 2264                                                               | 114.15                                                      | 5.659                                                      | 2.386                                                         | 0.000                                                                 | 2.386                                                                   | 0.585                                                                           |
|                              | 94                    | 23 : 47 : 36         | 2305                                                               | 121.21                                                      | 6.101                                                      | 2.460                                                         | 0.000                                                                 | 2.460                                                                   | 0.561                                                                           |
|                              | 95                    | 00 : 28 : 53         | 2346                                                               | 128.07                                                      | 6.368                                                      | 2.530                                                         | 0.000                                                                 | 2.530                                                                   | 0.527                                                                           |
|                              | 95                    | 01 : 10 : 11         | 2388                                                               | 135.55                                                      | 6.679                                                      | 2.606                                                         | 0.000                                                                 | 2.606                                                                   | 0.579                                                                           |
|                              | 95                    | 01 : 51 : 29         | 2429                                                               | 143.12                                                      | 6.909                                                      | 2.680                                                         | 0.000                                                                 | 2.680                                                                   | 0.557                                                                           |
| UE                           | 95                    | 02 : 32 : 45         | 2470                                                               | 150.69                                                      | 7.128                                                      | 2.748                                                         | 0.000                                                                 | 2.748                                                                   | 0.512                                                                           |
|                              | 95                    | 02 : 34 : 18         | 2472                                                               | 151.07                                                      | 7.143                                                      | 2.753                                                         | 0.000                                                                 | 2.753                                                                   | 1.132                                                                           |
|                              | 95                    | 02 : 36 : 31         | 2474                                                               | 150.29                                                      | 7.066                                                      | 2.754                                                         | 0.000                                                                 | 2.754                                                                   | 0.169                                                                           |
|                              | 95                    | 05 : 40 : 25         | 2658                                                               | 100.51                                                      | -0.556                                                     | 2.731                                                         | 0.000                                                                 | 2.731                                                                   | -0.040                                                                          |
|                              | 95                    | 08 : 44 : 21         | 2842                                                               | 70.10                                                       | -1.875                                                     | 2.636                                                         | 0.000                                                                 | 2.636                                                                   | -0.161                                                                          |
|                              | 95                    | 11 : 48 : 15         | 3026                                                               | 48.18                                                       | -2.737                                                     | 2.511                                                         | 0.000                                                                 | 2.511                                                                   | -0.211                                                                          |
|                              | 95                    | 14 : 52 : 07         | 3210                                                               | 32.32                                                       | -3.135                                                     | 2.358                                                         | 0.000                                                                 | 2.358                                                                   | -0.261                                                                          |
| US                           | 95                    | 17 : 56 : 02         | 3394                                                               | 20.86                                                       | -3.184                                                     | 2.183                                                         | 0.000                                                                 | 2.183                                                                   | -0.296                                                                          |
|                              | 95                    | 20 : 59 : 57         | 3578                                                               | 12.79                                                       | -3.260                                                     | 1.992                                                         | 0.000                                                                 | 1.992                                                                   | -0.326                                                                          |

## CALCULATED CRS LOADING DATA

FUGRO CONSULTANTS, INC.

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-8

☒ Undisturbed or ; ☐ Reconstituted - Specimen.

File Name: B-2302\_UD1;

Task No.: NA Date; Start: 4/1/2008

Back Pressure,  $U_{b,CS}$  (psi): 71.0 Piston Uplift,  $P_{up}$  (lbf): 34.87

Project Name: Exelon (Victoria) Completed: 4/5/2008

Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA

☐ Data corrected for salt ; in ☐ g/kg

Final Description of Specimen: Light Gray Fat CLAY with sand (CH)

Ring No.: 8 Area,  $A_r$  (cm<sup>2</sup>): 31.686 Solids Ht.,  $H_s$  (mm): 11.532 Specific Gravity,  $G_s = 2.680$  ☒ Meas. ; ☐ Assumed

**Initial:** Height  $H_o$ : 19.22 Water 22.5 Void 0.667 Deg. of 90.5 Total Unit 122.8 Dry Unit 100.2

**Final:** (mm):  $H_f$ : 18.18 Content,  $w$  (%): 21.4 Ratio,  $e$ : 0.576 Sat.,  $S$  (%): 99.7 Weight,  $\gamma_t$  (pcf): 128.7 Weight,  $\gamma_d$  (pcf): 105.9

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP HP

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.40                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | 0.21                                                                                                                  | 0.663                              | 2.83                                                    |                                                                |                                                                                         | 19.178                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 2.73                                                                    | 0.18                                                                                                                  | 0.664                              | 2.73                                                    | 0.001                                                          | 0.0                                                                                     | 19.183                                                |                                                                           |                                                                     | 0.663                                  |                                                   |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 2.72                                                                    | 0.18                                                                                                                  | 0.664                              | 2.72                                                    | 0.000                                                          | 0.0                                                                                     | 19.184                                                |                                                                           |                                                                     | 0.664                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 38                                                                       | 5.08                                                                    | 0.58                                                                                                                  | 0.657                              | 5.20                                                    | 0.174                                                          | 3.4                                                                                     | 19.107                                                | 3.90                                                                      |                                                                     | 0.660                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 76                                                                       | 6.78                                                                    | 1.01                                                                                                                  | 0.650                              | 6.95                                                    | 0.255                                                          | 3.7                                                                                     | 19.024                                                | 5.93                                                                      |                                                                     | 0.653                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 121                                                                      | 8.94                                                                    | 1.50                                                                                                                  | 0.642                              | 9.10                                                    | 0.239                                                          | 2.6                                                                                     | 18.930                                                | 7.86                                                                      |                                                                     | 0.646                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 166                                                                      | 11.49                                                                   | 2.03                                                                                                                  | 0.633                              | 11.71                                                   | 0.330                                                          | 2.8                                                                                     | 18.828                                                | 10.21                                                                     | 18.93                                                               | 0.637                                  | 7.91E-03                                          | 9.10                                                                                           |                                                                                                  |
|                              | 211                                                                      | 14.16                                                                   | 2.54                                                                                                                  | 0.624                              | 14.43                                                   | 0.390                                                          | 2.7                                                                                     | 18.730                                                | 12.83                                                                     | 15.36                                                               | 0.629                                  | 5.99E-03                                          | 14.93                                                                                          |                                                                                                  |
|                              | 256                                                                      | 17.17                                                                   | 3.07                                                                                                                  | 0.615                              | 17.51                                                   | 0.500                                                          | 2.9                                                                                     | 18.628                                                | 15.67                                                                     | 13.93                                                               | 0.620                                  | 4.97E-03                                          | 20.53                                                                                          |                                                                                                  |
|                              | 301                                                                      | 20.21                                                                   | 3.59                                                                                                                  | 0.607                              | 20.61                                                   | 0.586                                                          | 2.8                                                                                     | 18.528                                                | 18.69                                                                     | 11.36                                                               | 0.611                                  | 3.98E-03                                          | 22.56                                                                                          |                                                                                                  |
|                              | 346                                                                      | 23.51                                                                   | 4.13                                                                                                                  | 0.598                              | 23.99                                                   | 0.712                                                          | 3.0                                                                                     | 18.425                                                | 21.86                                                                     | 10.25                                                               | 0.602                                  | 3.37E-03                                          | 25.74                                                                                          |                                                                                                  |
|                              | 391                                                                      | 26.83                                                                   | 4.64                                                                                                                  | 0.589                              | 27.35                                                   | 0.780                                                          | 2.9                                                                                     | 18.326                                                | 25.17                                                                     | 8.76                                                                | 0.593                                  | 2.80E-03                                          | 26.68                                                                                          |                                                                                                  |
|                              | 436                                                                      | 30.43                                                                   | 5.14                                                                                                                  | 0.581                              | 31.03                                                   | 0.887                                                          | 2.9                                                                                     | 18.229                                                | 28.63                                                                     | 8.48                                                                | 0.585                                  | 2.40E-03                                          | 30.45                                                                                          |                                                                                                  |
|                              | 481                                                                      | 34.04                                                                   | 5.64                                                                                                                  | 0.572                              | 34.71                                                   | 1.003                                                          | 2.9                                                                                     | 18.133                                                | 32.24                                                                     | 7.42                                                                | 0.577                                  | 2.09E-03                                          | 30.78                                                                                          |                                                                                                  |
|                              | 526                                                                      | 37.96                                                                   | 6.14                                                                                                                  | 0.564                              | 38.73                                                   | 1.141                                                          | 2.9                                                                                     | 18.039                                                | 36.00                                                                     | 7.05                                                                | 0.568                                  | 1.80E-03                                          | 33.22                                                                                          |                                                                                                  |
|                              | 571                                                                      | 41.98                                                                   | 6.63                                                                                                                  | 0.556                              | 42.83                                                   | 1.277                                                          | 3.0                                                                                     | 17.943                                                | 39.97                                                                     | 6.32                                                                | 0.560                                  | 1.59E-03                                          | 33.47                                                                                          |                                                                                                  |

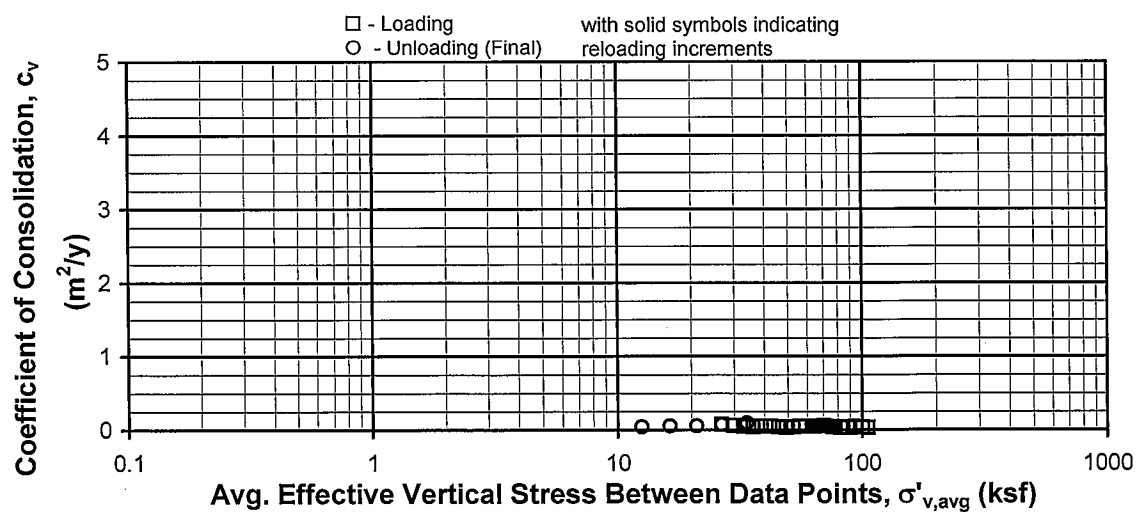
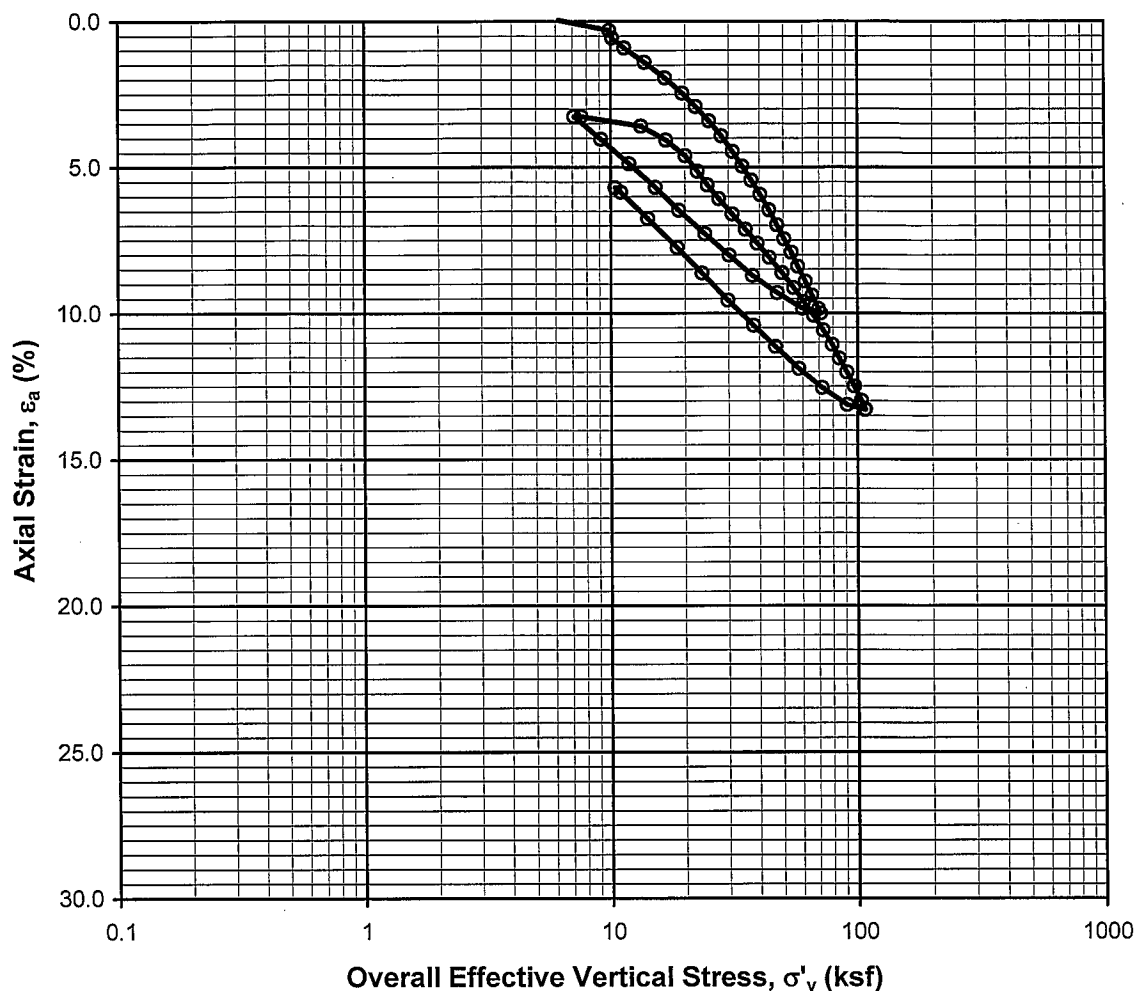
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Loading Info.<br>(1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                             |                                                 |                               |                                          | Steady State Ratio, $SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $C_{\alpha} = \Delta d_{a,sc} / H_o$ ( $\times 10^{-4}$ ) |
|----------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|-------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|                      |                                                        |                                                          |                                                                                                              |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf) | Coefficient of Consolidation, $c_v$ ( $m^2/y$ ) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                        |
|                      | 616                                                    | 46.21                                                    | 7.12                                                                                                         | 0.548                     | 47.20                                       | 1.479                                              | 3.1                                                                      | 17.849                                    | 44.09                                                      | 5.84                                            | 0.552                         | 1.37E-03                                 | 34.38                                                                                 |                                                                                        |
|                      | 661                                                    | 50.76                                                    | 7.60                                                                                                         | 0.540                     | 51.88                                       | 1.662                                              | 3.2                                                                      | 17.757                                    | 48.49                                                      | 5.42                                            | 0.544                         | 1.15E-03                                 | 35.16                                                                                 |                                                                                        |
|                      | 706                                                    | 55.42                                                    | 8.08                                                                                                         | 0.532                     | 56.71                                       | 1.910                                              | 3.4                                                                      | 17.665                                    | 53.09                                                      | 4.87                                            | 0.536                         | 1.01E-03                                 | 34.60                                                                                 |                                                                                        |
|                      | 751                                                    | 60.54                                                    | 8.56                                                                                                         | 0.524                     | 61.91                                       | 2.052                                              | 3.3                                                                      | 17.572                                    | 57.98                                                      | 4.68                                            | 0.528                         | 9.07E-04                                 | 36.21                                                                                 |                                                                                        |
|                      | 796                                                    | 65.82                                                    | 9.02                                                                                                         | 0.516                     | 67.12                                       | 1.935                                              | 2.9                                                                      | 17.485                                    | 63.18                                                      | 4.61                                            | 0.520                         | 8.44E-04                                 | 38.57                                                                                 |                                                                                        |
| UE                   | 841                                                    | 71.32                                                    | 9.49                                                                                                         | 0.508                     | 72.60                                       | 1.899                                              | 2.6                                                                      | 17.395                                    | 68.57                                                      | 5.00                                            | 0.512                         | 8.87E-04                                 | 45.09                                                                                 |                                                                                        |
|                      | 886                                                    | 76.96                                                    | 9.94                                                                                                         | 0.501                     | 78.45                                       | 2.220                                              | 2.8                                                                      | 17.307                                    | 74.14                                                      |                                                 | 0.505                         |                                          |                                                                                       |                                                                                        |
|                      | 890                                                    | 77.53                                                    | 9.99                                                                                                         | 0.500                     | 79.03                                       | 2.244                                              | 2.8                                                                      | 17.298                                    | 77.25                                                      |                                                 | 0.500                         |                                          |                                                                                       |                                                                                        |
|                      | 890                                                    | 77.37                                                    | 10.00                                                                                                        | 0.500                     | 78.87                                       | 2.241                                              | 2.8                                                                      | 17.296                                    | 77.45                                                      |                                                 | 0.500                         |                                          |                                                                                       |                                                                                        |
|                      | 965                                                    | 58.85                                                    | 9.96                                                                                                         | 0.501                     | 58.73                                       | -0.180                                             | -0.3                                                                     | 17.304                                    | 68.11                                                      |                                                 | 0.500                         |                                          |                                                                                       |                                                                                        |
|                      | 1040                                                   | 46.55                                                    | 9.76                                                                                                         | 0.504                     | 46.13                                       | -0.634                                             | -1.4                                                                     | 17.343                                    | 52.70                                                      |                                                 | 0.502                         |                                          |                                                                                       |                                                                                        |
|                      | 1115                                                   | 37.59                                                    | 9.50                                                                                                         | 0.508                     | 36.99                                       | -0.905                                             | -2.4                                                                     | 17.393                                    | 42.07                                                      |                                                 | 0.506                         |                                          |                                                                                       |                                                                                        |
|                      | 1190                                                   | 30.21                                                    | 9.19                                                                                                         | 0.513                     | 29.49                                       | -1.075                                             | -3.6                                                                     | 17.452                                    | 33.90                                                      |                                                 | 0.511                         |                                          |                                                                                       |                                                                                        |
| US                   | 1266                                                   | 24.29                                                    | 8.84                                                                                                         | 0.519                     | 23.53                                       | -1.140                                             | -4.8                                                                     | 17.519                                    | 27.25                                                      |                                                 | 0.516                         |                                          |                                                                                       |                                                                                        |
|                      | 1341                                                   | 19.24                                                    | 8.45                                                                                                         | 0.526                     | 18.46                                       | -1.187                                             | -6.4                                                                     | 17.593                                    | 21.76                                                      | 4.86                                            | 0.522                         | 7.23E-04                                 | 4.50                                                                                  |                                                                                        |
|                      | 1416                                                   | 15.78                                                    | 8.04                                                                                                         | 0.533                     | 15.00                                       | -1.189                                             | -7.9                                                                     | 17.673                                    | 17.51                                                      | 3.29                                            | 0.529                         | 7.67E-04                                 | 6.04                                                                                  |                                                                                        |
|                      | 1491                                                   | 12.75                                                    | 7.67                                                                                                         | 0.539                     | 11.98                                       | -1.172                                             | -9.8                                                                     | 17.745                                    | 14.27                                                      | 2.94                                            | 0.536                         | 6.99E-04                                 | 8.04                                                                                  |                                                                                        |
|                      | 1566                                                   | 10.00                                                    | 7.25                                                                                                         | 0.546                     | 9.20                                        | -1.219                                             | -13.3                                                                    | 17.824                                    | 11.37                                                      | 2.73                                            | 0.542                         | 7.69E-04                                 | 9.88                                                                                  |                                                                                        |
| UE                   | 1641                                                   | 7.82                                                     | 6.82                                                                                                         | 0.553                     | 7.03                                        | -1.218                                             | -17.3                                                                    | 17.908                                    | 8.91                                                       | 2.14                                            | 0.549                         | 7.95E-04                                 | 9.59                                                                                  |                                                                                        |
|                      | 1642                                                   | 7.76                                                     | 6.81                                                                                                         | 0.553                     | 6.97                                        | -1.219                                             | -17.5                                                                    | 17.909                                    | 7.79                                                       |                                                 | 0.553                         |                                          |                                                                                       |                                                                                        |
|                      | 1645                                                   | 8.54                                                     | 6.81                                                                                                         | 0.553                     | 7.82                                        | -1.113                                             | -14.2                                                                    | 17.909                                    | 8.15                                                       |                                                 | 0.553                         |                                          |                                                                                       |                                                                                        |
|                      | 1686                                                   | 17.62                                                    | 7.11                                                                                                         | 0.548                     | 18.11                                       | 0.730                                              | 4.0                                                                      | 17.852                                    | 13.08                                                      |                                                 | 0.551                         |                                          |                                                                                       |                                                                                        |
|                      | 1727                                                   | 24.30                                                    | 7.44                                                                                                         | 0.543                     | 25.24                                       | 1.392                                              | 5.5                                                                      | 17.789                                    | 20.96                                                      |                                                 | 0.545                         |                                          |                                                                                       |                                                                                        |
| US                   | 1768                                                   | 30.62                                                    | 7.81                                                                                                         | 0.536                     | 31.90                                       | 1.902                                              | 6.0                                                                      | 17.716                                    | 27.46                                                      |                                                 | 0.539                         |                                          |                                                                                       |                                                                                        |
|                      | 1810                                                   | 36.79                                                    | 8.20                                                                                                         | 0.530                     | 38.38                                       | 2.359                                              | 6.1                                                                      | 17.642                                    | 33.71                                                      | 5.88                                            | 0.533                         | 7.46E-04                                 | 2.96                                                                                  |                                                                                        |
|                      | 1851                                                   | 43.02                                                    | 8.58                                                                                                         | 0.524                     | 44.86                                       | 2.739                                              | 6.1                                                                      | 17.569                                    | 39.91                                                      | 4.87                                            | 0.527                         | 6.09E-04                                 | 4.94                                                                                  |                                                                                        |
|                      | 1892                                                   | 49.63                                                    | 8.98                                                                                                         | 0.517                     | 51.69                                       | 3.059                                              | 5.9                                                                      | 17.493                                    | 46.32                                                      | 4.47                                            | 0.520                         | 5.50E-04                                 | 6.86                                                                                  |                                                                                        |
|                      | 1934                                                   | 56.38                                                    | 9.36                                                                                                         | 0.511                     | 58.58                                       | 3.278                                              | 5.6                                                                      | 17.420                                    | 53.00                                                      | 4.10                                            | 0.514                         | 4.78E-04                                 | 8.46                                                                                  |                                                                                        |
|                      | 1975                                                   | 63.37                                                    | 9.72                                                                                                         | 0.505                     | 65.66                                       | 3.419                                              | 5.2                                                                      | 17.350                                    | 59.87                                                      | 3.96                                            | 0.508                         | 4.29E-04                                 | 10.30                                                                                 |                                                                                        |
|                      | 2016                                                   | 70.73                                                    | 10.10                                                                                                        | 0.498                     | 73.08                                       | 3.494                                              | 4.8                                                                      | 17.277                                    | 67.05                                                      | 4.00                                            | 0.501                         | 4.37E-04                                 | 12.57                                                                                 |                                                                                        |

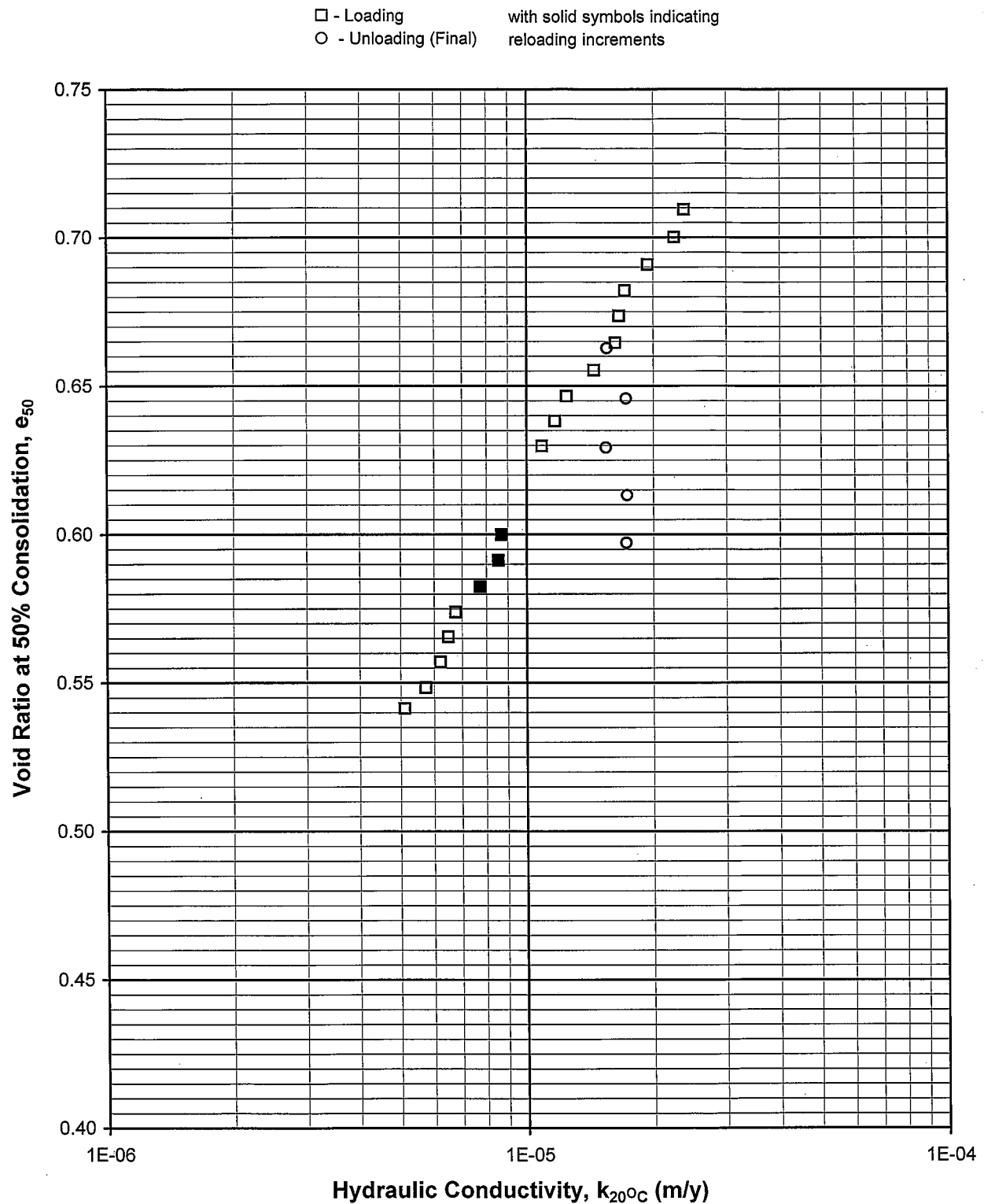


## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-16A - Depth 120.5 - 122.5 ft  
 Boring B-2302UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-16A - Depth 120.5 - 122.5 ft  
Boring B-2302UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-9 File Name: B-2302\_UD16a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas.; ☐ Assumed Ring No.: 9  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.659  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                               |                                                      |                                |                                   |                                  |                                                          |                         |
|---------------------------------------------------------------|------------------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube                      | <input type="checkbox"/> Field Extruded              | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2302UD                                          | <input type="checkbox"/> LPC Core                    |                                |                                   | Impact/Rammer                    | Rammer Wgt.(lb)=                                         | No. Layers =            |
| Sample No.: UD-16                                             | Composite No.:                                       |                                |                                   | Pluviated:                       | Tamper Force (lb)=                                       | Drop (in.) =            |
| Depth (ft): 120.5 - 122.5                                     | Specimen No.: A                                      |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input checked="" type="checkbox"/> Spec. Selection by X-ray; | <input checked="" type="checkbox"/> Geomarine Sample |                                |                                   | Ref. Effort=                     | % Comp. =                                                | ± Opt.=                 |

| Water Content (W);                                       | Initial - Trimming Location |                                                              |             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|--------------------------------------------------------------|-------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)                                                  | Sides (W3)  |                                |                                                      |         |        |
| Container No.                                            | 2021                        | 2037                                                         | 5028        | 752                            | Mass Moist Soil + Ring (g)                           | 331.74  | 329.84 |
| Mass Moist Soil + Container (g)                          | 122.09                      | 116.59                                                       | 89.61       | 59.46                          | Mass Ring (g)                                        | 212.46  |        |
| Mass Dry Soil + Container (g)                            | 103.67                      | 98.75                                                        | 77.84       | 54.14                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 119.28  | 117.38 |
| Mass Container (g)                                       | 30.70                       | 30.77                                                        | 30.92       | 31.99                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| WATER CONTENT (%)                                        | 25.24                       | 26.24                                                        | 25.09       | 24.02                          | Container No.                                        | 2018    |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 25.52                       | Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ; | Whole Spec. |                                | Mass Dry Soil + Container (g)                        | 30.76   |        |
| See attached data sheet(s) for additional water contents |                             |                                                              |             |                                | Mass Container (g)                                   | 30.56   |        |
|                                                          |                             |                                                              |             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.20    |        |

| Soil Height: Measurements (mm)                                                                                                                                                                                                                                                                     |  |               |  |   |            |  |               |       |  | Soil Height: Calculations, (mm)                         |    |                                                       |                                                                     | Initial                                                   | Final  |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------|--|---|------------|--|---------------|-------|--|---------------------------------------------------------|----|-------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------|--------|--------|
| Initial                                                                                                                                                                                                                                                                                            |  |               |  |   | Final      |  |               |       |  | Height of Gauge Block, $H_{gb}$ (1)                     |    |                                                       |                                                                     | 0.000                                                     | 19.050 |        |
| with Spec.                                                                                                                                                                                                                                                                                         |  | without Spec. |  |   | with Spec. |  | without Spec. |       |  |                                                         |    |                                                       |                                                                     |                                                           |        |        |
| 19.220                                                                                                                                                                                                                                                                                             |  | 0.000         |  |   | 12.180     |  | 13.040        |       |  | Reading on Gauge Block, $d_{gb}$                        |    |                                                       |                                                                     | 0.000                                                     | 0.000  |        |
| 19.190                                                                                                                                                                                                                                                                                             |  | 0.000         |  |   | 12.080     |  | 12.930        |       |  | Avg. Reading on Soil, $d_{soil}$                        |    |                                                       |                                                                     | 19.192                                                    | 12.140 |        |
| 19.210                                                                                                                                                                                                                                                                                             |  | 0.000         |  |   | 12.180     |  | 12.970        |       |  | Avg. Reading on Apparatus without Specimen, $d_{app}$   |    |                                                       |                                                                     | 0.000                                                     | 12.968 |        |
| 19.160                                                                                                                                                                                                                                                                                             |  | 0.000         |  |   | 12.200     |  | 12.980        |       |  | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |    |                                                       |                                                                     | 19.192                                                    | 18.222 |        |
| 19.180                                                                                                                                                                                                                                                                                             |  | 0.000         |  |   | 12.060     |  | 12.920        |       |  |                                                         |    | Soil Height: Final by Dial Change During Test (mm)    |                                                                     |                                                           |        |        |
|                                                                                                                                                                                                                                                                                                    |  |               |  |   |            |  |               |       |  |                                                         |    | Initial Height, $H_o$                                 |                                                                     |                                                           |        | 19.192 |
|                                                                                                                                                                                                                                                                                                    |  | Yes ;         |  | X | No         |  | X             | Yes ; |  |                                                         | No | Require $H_{gb}$ & $d_{gb}$ <sup>(1)</sup>            | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |                                                           | 1.092  |        |
|                                                                                                                                                                                                                                                                                                    |  | Yes ;         |  | X | No         |  | X             | Yes ; |  |                                                         | No |                                                       | Filter Paper Included:                                              | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$ |        | 18.100 |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec.: ~ 12.7 mm; CRS ~ 25 mm<br>Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height. |  |               |  |   |            |  |               |       |  |                                                         |    | Final Soil Height Measurement, $H_{f,m}$              |                                                                     |                                                           |        | 18.222 |
|                                                                                                                                                                                                                                                                                                    |  |               |  |   |            |  |               |       |  |                                                         |    | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$ |                                                                     |                                                           |        | -0.64  |
|                                                                                                                                                                                                                                                                                                    |  |               |  |   |            |  |               |       |  |                                                         |    |                                                       |                                                                     |                                                           |        |        |

| Estimated Initial Unit Weight                                                              |                                  |  |  | Soil Extruded During Loading                            |      |
|--------------------------------------------------------------------------------------------|----------------------------------|--|--|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf)= 122.55                                                        | Dry, $\gamma_{d,o}$ (pcf)= 97.63 |  |  | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54;                     | <input type="checkbox"/> Other   |  |  | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No |                                  |  |  | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No  |                                  |  |  | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Very Pale Brown Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 3/31/2008 Date: 4/1/2008 Final Calc. By: DH Date: 4/23/2008  
 Reviewed By: HP ~~HP~~

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-9 File Name: B-2302\_UD16a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 25.24                    | 95.24                    | 93.8                         | 98.1                  | 99.8  |
| 2                | " Bottom, W2          | 26.24                    | 94.48                    | 95.7                         | 100.2                 | 101.9 |
| 3                | " Sides, W3           | 25.09                    | 95.36                    | 93.5                         | 97.8                  | 99.5  |
| 4                | " Average, W4         | 25.52                    | 95.03                    | 94.3                         | 98.7                  | 100.4 |
| 5                | " Back Calculated (1) | 25.76                    | 94.85 (3)                | 94.8                         | 99.2                  | 100.9 |
| 6                | Final                 | 24.02                    | 94.85 (2)                | 94.8                         | 99.2                  | 100.9 |

|                                                                                                                                                                    |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                                                                                    |  |
| Used Cal. Routine No. 5 to obtain the mass of dry soil and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |
| Back Cal. $G_s$ = 2.706                                                                                                                                            |  |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.713                                                                                                            |  |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_s$                                                                | 0.11634 |
| Final Selected, $K_r$                                                           | 0.11634 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 94.56                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 94.70                                                 |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                                  |                                                                        |                                                     |                         |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------|-------------------------|
| Specific Gravity<br>G <sub>s</sub> = 2.720 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                                  |                                                                        |                                                     |                         |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                  |                                                                        |                                                     |                         |
| Mass Dry Soil, (g)                         | Initial: 94.85       |               | X                           | From Cal. Routine No. 5                 |                                                                                          | Note: Routine #5 is based on final measurements. |                                                                        |                                                     |                         |
|                                            | Final (4): NA        |               |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%    |                                                                        |                                                     |                         |
| Initial Height (mm) =                      |                      |               | 19.19                       | X                                       | Measured ;                                                                               |                                                  |                                                                        | Back Calculated                                     | Back-cal. Sat. (%) = NA |
| Final Height (mm) =                        |                      |               | 18.22                       | X                                       | Measured ;                                                                               |                                                  |                                                                        | Initial H <sub>o</sub> & dial change during loading |                         |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm)      | Extruded soil loss proportioned in increasing loading increments (5) : |                                                     |                         |
| Initial                                    | 25.8                 | 0.739         | 94.8                        | 122.6                                   | 97.5                                                                                     | 11.034                                           | From                                                                   | To (ksf)                                            |                         |
| Final                                      | 23.8                 | 0.651         | 99.2                        | 127.0                                   | 102.6                                                                                    | NA                                               | NA                                                                     | NA                                                  |                         |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 76 | Minus 200 (%) |
| Casagrande Method      | 30.00             | NA                                | 0.181 | 0.103 | 2.8 | Plastic Limit (PL)    | 16 | 87.1          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 60 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP

Date: 4/24/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-9 File Name: B-2302\_UD16a  
 Task No.: NA Date; Start: 4/1/2008 Initial Height,  $H_o$  (mm): 19.19  
 Project Name: Exelon (Victoria) Completed: 4/23/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6591  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.27159,  $V$ : 0.023597341 Piston Uplift,  $P_{up}$  (lbf): 34.52  
 Back Pressure,  $U_{b, CS}$  (psi): 70.27511,  $V$ : 0.023598519 Setup  $DT_{ref}$  (V): 0.000662986  
 Displacement Transducer No.: DT-109 Calib. Factor (mm/V): 216.802057 Ch. No.: 2  
 Pore Press. Transducer No.: PT-118 Calib. Factor (psi/V): 2990.57176 Ref. Zero (V): 0.000100 Ch. No.: 3  
 Force Cell No.: FT-110 Calib. Factor (lbf/V): -468290.88 Ref. Zero (V): -0.000065 Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP 

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>$n$ & $n-1$ ,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| S                            | 92                    | 17 : 10 : 09         |                                                                    | 0.14                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                   |
| BS                           | 92                    | 17 : 41 : 49         |                                                                    | 2.35                                                        |                                                            | 0.039                                                         | 0.000                                                                 | 0.039                                                                   |                                                                                   |
| BE                           | 93                    | 09 : 24 : 17         |                                                                    | 6.18                                                        | -0.001                                                     | -0.009                                                        | 0.000                                                                 | -0.009                                                                  |                                                                                   |
| CS                           | 93                    | 09 : 24 : 20         | 0                                                                  | 6.18                                                        | 0.000                                                      | -0.009                                                        | 0.000                                                                 | -0.009                                                                  |                                                                                   |
|                              | 93                    | 10 : 04 : 56         | 41                                                                 | 11.98                                                       | 2.986                                                      | 0.059                                                         | 0.000                                                                 | 0.059                                                                   | 0.520                                                                             |
|                              | 93                    | 11 : 14 : 58         | 111                                                                | 13.93                                                       | 5.270                                                      | 0.108                                                         | 0.000                                                                 | 0.108                                                                   | 0.222                                                                             |
|                              | 93                    | 14 : 13 : 09         | 289                                                                | 16.61                                                       | 7.206                                                      | 0.174                                                         | 0.000                                                                 | 0.174                                                                   | 0.116                                                                             |
| US                           | 93                    | 18 : 50 : 06         | 566                                                                | 20.26                                                       | 8.945                                                      | 0.269                                                         | 0.000                                                                 | 0.269                                                                   | 0.107                                                                             |
|                              | 93                    | 23 : 27 : 02         | 843                                                                | 24.91                                                       | 11.337                                                     | 0.372                                                         | 0.000                                                                 | 0.372                                                                   | 0.116                                                                             |
|                              | 94                    | 04 : 03 : 59         | 1120                                                               | 29.03                                                       | 13.020                                                     | 0.473                                                         | 0.000                                                                 | 0.473                                                                   | 0.114                                                                             |
|                              | 94                    | 08 : 40 : 56         | 1397                                                               | 32.27                                                       | 14.052                                                     | 0.561                                                         | 0.000                                                                 | 0.561                                                                   | 0.100                                                                             |
|                              | 94                    | 13 : 17 : 53         | 1674                                                               | 35.71                                                       | 14.724                                                     | 0.655                                                         | 0.000                                                                 | 0.655                                                                   | 0.106                                                                             |
|                              | 94                    | 17 : 54 : 50         | 1951                                                               | 40.22                                                       | 16.731                                                     | 0.753                                                         | 0.000                                                                 | 0.753                                                                   | 0.110                                                                             |
|                              | 94                    | 22 : 31 : 47         | 2227                                                               | 44.34                                                       | 18.164                                                     | 0.857                                                         | 0.000                                                                 | 0.857                                                                   | 0.117                                                                             |
|                              | 95                    | 03 : 08 : 44         | 2504                                                               | 47.89                                                       | 19.036                                                     | 0.954                                                         | 0.000                                                                 | 0.954                                                                   | 0.109                                                                             |
|                              | 95                    | 07 : 45 : 41         | 2781                                                               | 51.28                                                       | 19.779                                                     | 1.044                                                         | 0.000                                                                 | 1.044                                                                   | 0.102                                                                             |
|                              | 95                    | 12 : 22 : 38         | 3058                                                               | 55.81                                                       | 21.516                                                     | 1.139                                                         | 0.000                                                                 | 1.139                                                                   | 0.107                                                                             |
|                              | 95                    | 16 : 59 : 35         | 3335                                                               | 60.74                                                       | 23.491                                                     | 1.241                                                         | 0.000                                                                 | 1.241                                                                   | 0.115                                                                             |
|                              | 95                    | 21 : 36 : 32         | 3612                                                               | 65.20                                                       | 24.945                                                     | 1.340                                                         | 0.000                                                                 | 1.340                                                                   | 0.112                                                                             |
|                              | 96                    | 02 : 13 : 29         | 3889                                                               | 68.97                                                       | 25.795                                                     | 1.430                                                         | 0.000                                                                 | 1.430                                                                   | 0.102                                                                             |
|                              | 96                    | 06 : 50 : 26         | 4166                                                               | 73.56                                                       | 27.289                                                     | 1.520                                                         | 0.000                                                                 | 1.520                                                                   | 0.101                                                                             |
| UE                           | 96                    | 11 : 27 : 22         | 4443                                                               | 79.51                                                       | 30.693                                                     | 1.612                                                         | 0.000                                                                 | 1.612                                                                   | 0.104                                                                             |
|                              | 96                    | 16 : 04 : 19         | 4720                                                               | 84.58                                                       | 32.034                                                     | 1.710                                                         | 0.000                                                                 | 1.710                                                                   | 0.111                                                                             |
|                              | 96                    | 20 : 41 : 16         | 4997                                                               | 88.79                                                       | 32.370                                                     | 1.801                                                         | 0.000                                                                 | 1.801                                                                   | 0.103                                                                             |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                              | 97                    | 01 : 18 : 16         | 5274                                                               | 93.50                                                       | 33.173                                                     | 1.890                                                         | 0.000                                                                 | 1.890                                                                   | 0.100                                                                           |
|                              | 97                    | 03 : 50 : 35         | 5426                                                               | 95.40                                                       | 33.722                                                     | 1.920                                                         | 0.000                                                                 | 1.920                                                                   | 0.061                                                                           |
|                              | 97                    | 03 : 50 : 36         | 5426                                                               | 95.40                                                       | 33.722                                                     | 1.920                                                         | 0.000                                                                 | 1.920                                                                   | 0.435                                                                           |
|                              | 97                    | 18 : 04 : 32         | 6280                                                               | 62.33                                                       | 3.421                                                      | 1.888                                                         | 0.000                                                                 | 1.888                                                                   | -0.012                                                                          |
|                              | 98                    | 08 : 18 : 31         | 7134                                                               | 46.38                                                       | -1.617                                                     | 1.786                                                         | 0.000                                                                 | 1.786                                                                   | -0.037                                                                          |
|                              | 98                    | 22 : 32 : 29         | 7988                                                               | 34.79                                                       | -4.250                                                     | 1.672                                                         | 0.000                                                                 | 1.672                                                                   | -0.042                                                                          |
| US                           | 99                    | 12 : 46 : 27         | 8842                                                               | 26.46                                                       | -5.802                                                     | 1.539                                                         | 0.000                                                                 | 1.539                                                                   | -0.049                                                                          |
|                              | 100                   | 03 : 00 : 26         | 9696                                                               | 19.76                                                       | -6.725                                                     | 1.398                                                         | 0.000                                                                 | 1.398                                                                   | -0.051                                                                          |
|                              | 100                   | 17 : 14 : 23         | 10550                                                              | 14.27                                                       | -7.438                                                     | 1.242                                                         | 0.000                                                                 | 1.242                                                                   | -0.057                                                                          |
|                              | 101                   | 07 : 28 : 24         | 11404                                                              | 10.47                                                       | -7.805                                                     | 1.090                                                         | 0.000                                                                 | 1.090                                                                   | -0.056                                                                          |
|                              | 101                   | 21 : 42 : 23         | 12258                                                              | 7.24                                                        | -7.970                                                     | 0.937                                                         | 0.000                                                                 | 0.937                                                                   | -0.056                                                                          |
| UE                           | 102                   | 11 : 56 : 20         | 13112                                                              | 4.70                                                        | -8.053                                                     | 0.775                                                         | 0.000                                                                 | 0.775                                                                   | -0.059                                                                          |
|                              | 103                   | 01 : 48 : 03         | 13944                                                              | 3.05                                                        | -7.885                                                     | 0.626                                                         | 0.000                                                                 | 0.626                                                                   | -0.056                                                                          |
|                              | 103                   | 02 : 10 : 17         | 13966                                                              | 3.46                                                        | -7.854                                                     | 0.625                                                         | 0.000                                                                 | 0.625                                                                   | -0.009                                                                          |
|                              | 103                   | 07 : 10 : 18         | 14266                                                              | 9.07                                                        | -6.981                                                     | 0.689                                                         | 0.000                                                                 | 0.689                                                                   | 0.066                                                                           |
|                              | 103                   | 12 : 10 : 20         | 14566                                                              | 13.46                                                       | -5.220                                                     | 0.781                                                         | 0.000                                                                 | 0.781                                                                   | 0.097                                                                           |
|                              | 103                   | 17 : 10 : 21         | 14866                                                              | 18.78                                                       | -1.903                                                     | 0.884                                                         | 0.000                                                                 | 0.884                                                                   | 0.106                                                                           |
|                              | 103                   | 22 : 10 : 23         | 15166                                                              | 24.46                                                       | 2.919                                                      | 0.986                                                         | 0.000                                                                 | 0.986                                                                   | 0.107                                                                           |
|                              | 104                   | 03 : 10 : 24         | 15466                                                              | 30.08                                                       | 7.756                                                      | 1.076                                                         | 0.000                                                                 | 1.076                                                                   | 0.093                                                                           |
|                              | 104                   | 08 : 10 : 26         | 15766                                                              | 35.99                                                       | 12.050                                                     | 1.167                                                         | 0.000                                                                 | 1.167                                                                   | 0.095                                                                           |
| US                           | 104                   | 13 : 10 : 27         | 16066                                                              | 43.22                                                       | 16.882                                                     | 1.267                                                         | 0.000                                                                 | 1.267                                                                   | 0.104                                                                           |
|                              | 104                   | 18 : 10 : 29         | 16366                                                              | 49.91                                                       | 20.340                                                     | 1.368                                                         | 0.000                                                                 | 1.368                                                                   | 0.106                                                                           |
|                              | 104                   | 23 : 10 : 31         | 16666                                                              | 55.50                                                       | 22.438                                                     | 1.461                                                         | 0.000                                                                 | 1.461                                                                   | 0.097                                                                           |
|                              | 105                   | 04 : 10 : 32         | 16966                                                              | 61.53                                                       | 24.379                                                     | 1.554                                                         | 0.000                                                                 | 1.554                                                                   | 0.096                                                                           |
|                              | 105                   | 09 : 10 : 33         | 17266                                                              | 69.34                                                       | 27.461                                                     | 1.654                                                         | 0.000                                                                 | 1.654                                                                   | 0.105                                                                           |
|                              | 105                   | 14 : 10 : 34         | 17566                                                              | 76.53                                                       | 29.561                                                     | 1.753                                                         | 0.000                                                                 | 1.753                                                                   | 0.102                                                                           |
|                              | 105                   | 19 : 10 : 35         | 17866                                                              | 82.85                                                       | 30.810                                                     | 1.844                                                         | 0.000                                                                 | 1.844                                                                   | 0.095                                                                           |
|                              | 106                   | 00 : 10 : 37         | 18166                                                              | 89.66                                                       | 32.151                                                     | 1.934                                                         | 0.000                                                                 | 1.934                                                                   | 0.094                                                                           |
|                              | 106                   | 05 : 10 : 38         | 18466                                                              | 98.47                                                       | 35.569                                                     | 2.030                                                         | 0.000                                                                 | 2.030                                                                   | 0.100                                                                           |
|                              | 106                   | 10 : 10 : 40         | 18766                                                              | 106.40                                                      | 37.886                                                     | 2.126                                                         | 0.000                                                                 | 2.126                                                                   | 0.100                                                                           |
|                              | 106                   | 15 : 10 : 41         | 19066                                                              | 112.82                                                      | 39.397                                                     | 2.215                                                         | 0.000                                                                 | 2.215                                                                   | 0.093                                                                           |
|                              | 106                   | 20 : 10 : 43         | 19366                                                              | 120.00                                                      | 41.006                                                     | 2.305                                                         | 0.000                                                                 | 2.305                                                                   | 0.094                                                                           |
|                              | 107                   | 01 : 10 : 45         | 19666                                                              | 129.24                                                      | 44.876                                                     | 2.398                                                         | 0.000                                                                 | 2.398                                                                   | 0.097                                                                           |
|                              | 107                   | 06 : 10 : 46         | 19966                                                              | 137.57                                                      | 47.615                                                     | 2.492                                                         | 0.000                                                                 | 2.492                                                                   | 0.098                                                                           |
|                              | 107                   | 09 : 27 : 38         | 20163                                                              | 142.43                                                      | 48.587                                                     | 2.550                                                         | 0.000                                                                 | 2.550                                                                   | 0.091                                                                           |
| UE                           | 107                   | 09 : 38 : 29         | 20174                                                              | 141.69                                                      | 48.329                                                     | 2.553                                                         | 0.000                                                                 | 2.553                                                                   | 0.090                                                                           |
|                              | 108                   | 02 : 10 : 55         | 21167                                                              | 95.56                                                       | 6.718                                                      | 2.520                                                         | 0.000                                                                 | 2.520                                                                   | -0.010                                                                          |
|                              | 108                   | 18 : 43 : 23         | 22159                                                              | 71.15                                                       | -1.756                                                     | 2.410                                                         | 0.000                                                                 | 2.410                                                                   | -0.035                                                                          |
|                              | 109                   | 11 : 15 : 48         | 23151                                                              | 54.77                                                       | -4.786                                                     | 2.283                                                         | 0.000                                                                 | 2.283                                                                   | -0.040                                                                          |
|                              | 110                   | 03 : 48 : 14         | 24144                                                              | 42.38                                                       | -6.493                                                     | 2.137                                                         | 0.000                                                                 | 2.137                                                                   | -0.046                                                                          |
| US                           | 110                   | 20 : 20 : 41         | 25136                                                              | 33.05                                                       | -7.416                                                     | 2.001                                                         | 0.000                                                                 | 2.001                                                                   | -0.043                                                                          |
|                              | 111                   | 12 : 53 : 07         | 26129                                                              | 24.61                                                       | -8.161                                                     | 1.834                                                         | 0.000                                                                 | 1.834                                                                   | -0.052                                                                          |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]



# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-9 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2302\_UD10  
 Task No.: NA Date: Start: 4/1/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.3 Piston Uplift,  $P_{up}$  (lbf): 34.52  
 Project Name: Exelon (Victoria) Completed: 4/23/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$   
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Very Pale Brown Fat CLAY (CH)

Ring No.: 9 Area,  $A_r$  (cm<sup>2</sup>): 31.659 Solids Ht.,  $H_s$  (mm): 11.034 Specific Gravity,  $G_s = 2.720$  ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.19 Water 25.8 Void 0.739 Deg. of 94.8 Total Unit 122.6 Dry Unit 97.5  
**Final:** (mm):  $H_f$ : 18.22 Content,  $w$  (%): 23.8 Ratio,  $e$ : 0.651 Sat.,  $S$  (%): 99.2 Weight,  $\gamma_t$  (pcf): 127.0 Weight,  $\gamma_d$  (pcf): 102.6

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *HP*

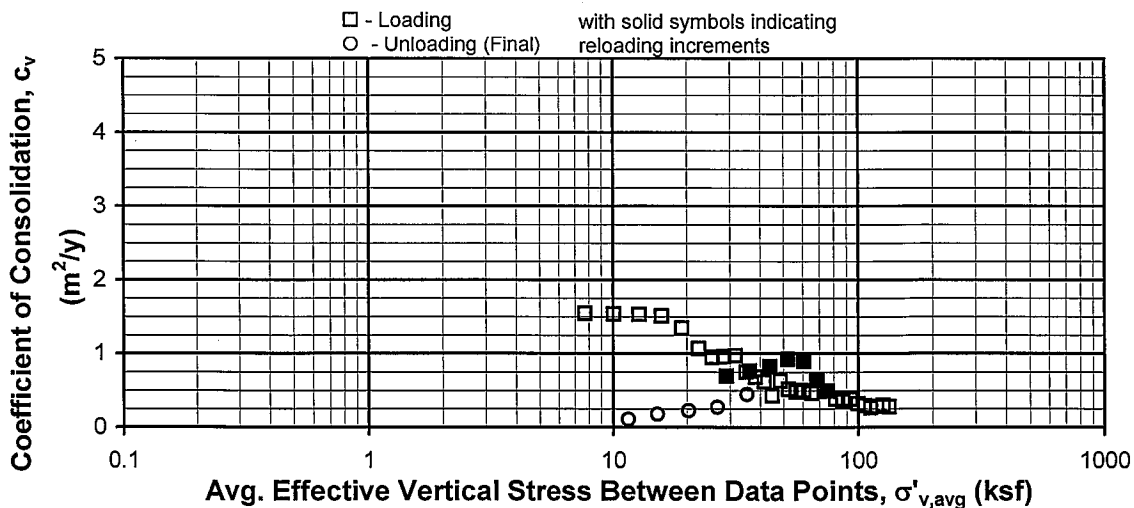
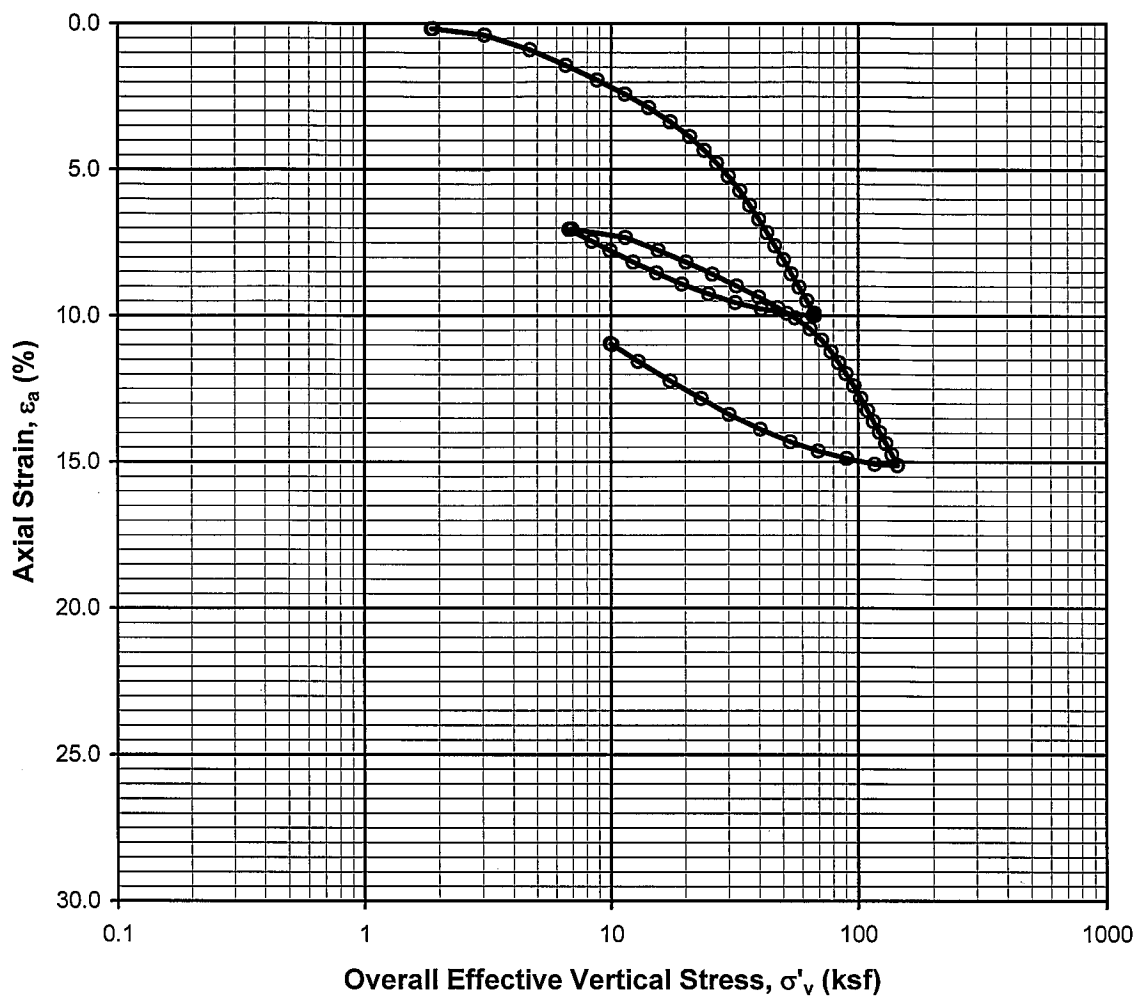
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.14                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
| BS                           |                                                                          |                                                                         | 0.20                                                                                                                  | 0.736                              | 2.35                                                    |                                                                |                                                                                         | 19.153                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
| BE                           |                                                                          | 6.18                                                                    | -0.05                                                                                                                 | 0.740                              | 6.18                                                    | -0.001                                                         | 0.0                                                                                     | 19.201                                                |                                                                           |                                                                     | 0.738                                  |                                                   |                                                                                                |                                                                                                        |
| CS                           | 0                                                                        | 6.18                                                                    | -0.05                                                                                                                 | 0.740                              | 6.18                                                    | 0.000                                                          | 0.0                                                                                     | 19.201                                                |                                                                           |                                                                     | 0.740                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 41                                                                       | 9.89                                                                    | 0.30                                                                                                                  | 0.734                              | 11.98                                                   | 2.986                                                          | 24.9                                                                                    | 19.133                                                | 8.04                                                                      |                                                                     | 0.737                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 111                                                                      | 10.15                                                                   | 0.56                                                                                                                  | 0.730                              | 13.93                                                   | 5.270                                                          | 37.8                                                                                    | 19.084                                                | 10.02                                                                     |                                                                     | 0.732                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 289                                                                      | 11.37                                                                   | 0.91                                                                                                                  | 0.724                              | 16.61                                                   | 7.206                                                          | 43.4                                                                                    | 19.018                                                | 10.76                                                                     |                                                                     | 0.727                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 566                                                                      | 13.74                                                                   | 1.40                                                                                                                  | 0.715                              | 20.26                                                   | 8.945                                                          | 44.1                                                                                    | 18.923                                                | 12.56                                                                     |                                                                     | 0.719                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 843                                                                      | 16.61                                                                   | 1.94                                                                                                                  | 0.706                              | 24.91                                                   | 11.337                                                         | 45.5                                                                                    | 18.820                                                | 15.18                                                                     |                                                                     | 0.710                                  |                                                   | 0.35                                                                                           |                                                                                                        |
|                              | 1120                                                                     | 19.52                                                                   | 2.46                                                                                                                  | 0.696                              | 29.03                                                   | 13.020                                                         | 44.9                                                                                    | 18.719                                                | 18.07                                                                     |                                                                     | 0.701                                  |                                                   | 0.51                                                                                           |                                                                                                        |
|                              | 1397                                                                     | 22.04                                                                   | 2.92                                                                                                                  | 0.688                              | 32.27                                                   | 14.052                                                         | 43.5                                                                                    | 18.631                                                | 20.78                                                                     |                                                                     | 0.692                                  |                                                   | 0.54                                                                                           |                                                                                                        |
|                              | 1674                                                                     | 25.05                                                                   | 3.41                                                                                                                  | 0.680                              | 35.71                                                   | 14.724                                                         | 41.2                                                                                    | 18.537                                                | 23.55                                                                     |                                                                     | 0.684                                  |                                                   | 0.74                                                                                           |                                                                                                        |
|                              | 1951                                                                     | 28.10                                                                   | 3.92                                                                                                                  | 0.671                              | 40.22                                                   | 16.731                                                         | 41.6                                                                                    | 18.439                                                | 26.58                                                                     | 0.07                                                                | 0.676                                  | 2.37E-05                                          | 1.11                                                                                           |                                                                                                        |
|                              | 2227                                                                     | 31.20                                                                   | 4.46                                                                                                                  | 0.662                              | 44.34                                                   | 18.164                                                         | 41.0                                                                                    | 18.335                                                | 29.65                                                                     | 0.06                                                                | 0.666                                  | 2.25E-05                                          | 1.10                                                                                           |                                                                                                        |
|                              | 2504                                                                     | 34.16                                                                   | 4.97                                                                                                                  | 0.653                              | 47.89                                                   | 19.036                                                         | 39.7                                                                                    | 18.238                                                | 32.68                                                                     | 0.05                                                                | 0.657                                  | 1.94E-05                                          | 1.05                                                                                           |                                                                                                        |
|                              | 2781                                                                     | 37.06                                                                   | 5.44                                                                                                                  | 0.645                              | 51.28                                                   | 19.779                                                         | 38.6                                                                                    | 18.148                                                | 35.61                                                                     | 0.04                                                                | 0.649                                  | 1.71E-05                                          | 1.10                                                                                           |                                                                                                        |
|                              | 3058                                                                     | 40.34                                                                   | 5.93                                                                                                                  | 0.636                              | 55.81                                                   | 21.516                                                         | 38.6                                                                                    | 18.053                                                | 38.70                                                                     | 0.05                                                                | 0.640                                  | 1.66E-05                                          | 1.57                                                                                           |                                                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

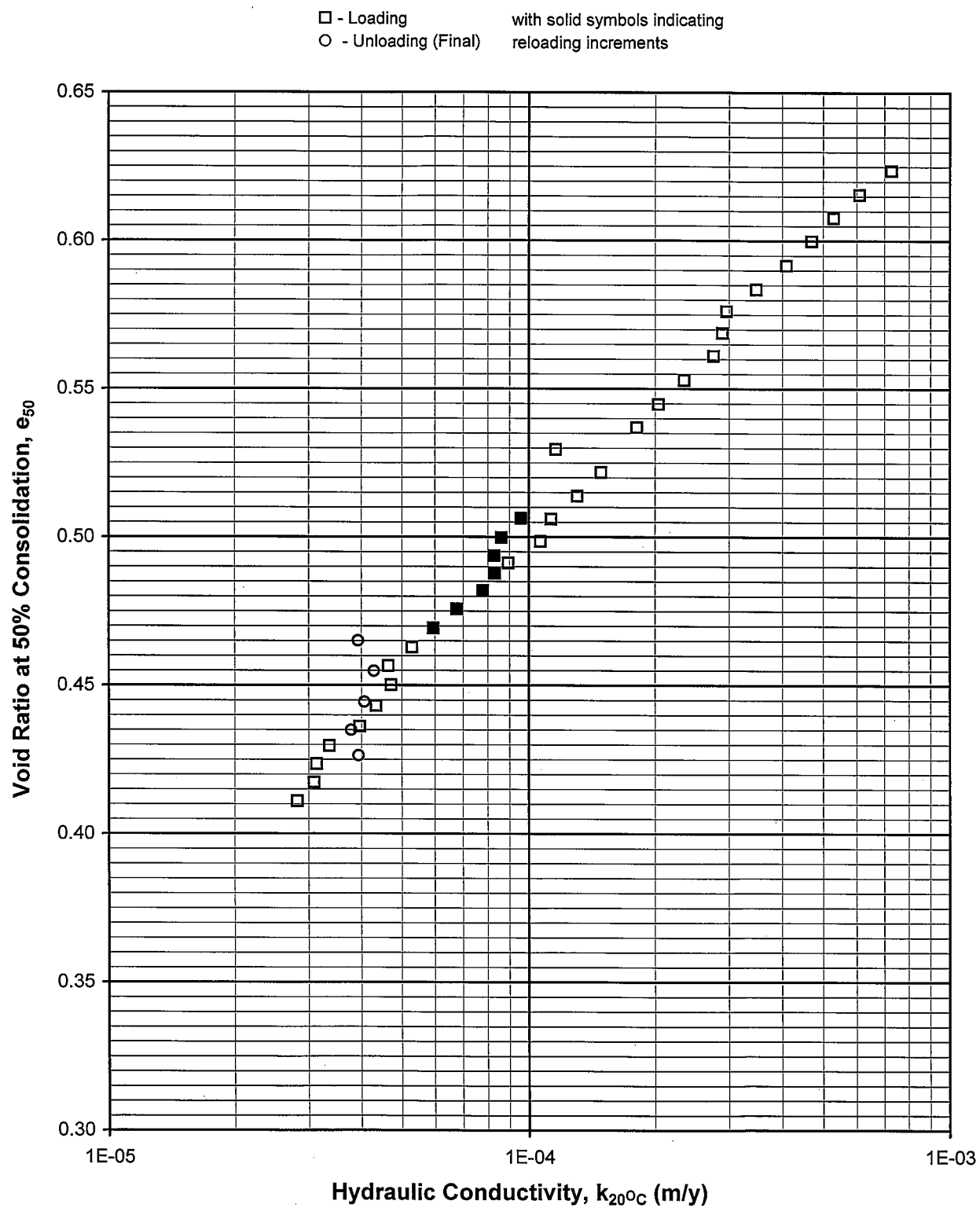
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 3335                                                                     | 43.84                                                                   | 6.46                                                                                                                        | 0.627                              | 60.74                                                   | 23.491                                                         | 38.7                                                                                    | 17.951                                                | 42.09                                                                     | 0.05                                                                | 0.632                                  | 1.62E-05                                          | 1.73                                                                                           |                                                                                                        |
|                              | 3612                                                                     | 47.28                                                                   | 6.98                                                                                                                        | 0.618                              | 65.20                                                   | 24.945                                                         | 38.3                                                                                    | 17.852                                                | 45.56                                                                     | 0.04                                                                | 0.622                                  | 1.45E-05                                          | 1.61                                                                                           |                                                                                                        |
|                              | 3889                                                                     | 50.48                                                                   | 7.45                                                                                                                        | 0.610                              | 68.97                                                   | 25.795                                                         | 37.4                                                                                    | 17.762                                                | 48.88                                                                     | 0.04                                                                | 0.614                                  | 1.25E-05                                          | 1.42                                                                                           |                                                                                                        |
|                              | 4166                                                                     | 54.00                                                                   | 7.92                                                                                                                        | 0.602                              | 73.56                                                   | 27.289                                                         | 37.1                                                                                    | 17.672                                                | 52.24                                                                     | 0.04                                                                | 0.606                                  | 1.17E-05                                          | 1.79                                                                                           |                                                                                                        |
| UE                           | 4443                                                                     | 57.43                                                                   | 8.40                                                                                                                        | 0.593                              | 79.51                                                   | 30.693                                                         | 38.6                                                                                    | 17.580                                                | 55.72                                                                     | 0.05                                                                | 0.597                                  | 1.09E-05                                          | 2.29                                                                                           |                                                                                                        |
|                              | 4720                                                                     | 61.58                                                                   | 8.91                                                                                                                        | 0.584                              | 84.58                                                   | 32.034                                                         | 37.9                                                                                    | 17.482                                                | 59.51                                                                     |                                                                     | 0.589                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 4997                                                                     | 65.62                                                                   | 9.39                                                                                                                        | 0.576                              | 88.79                                                   | 32.370                                                         | 36.5                                                                                    | 17.391                                                | 63.60                                                                     |                                                                     | 0.580                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 5274                                                                     | 69.81                                                                   | 9.85                                                                                                                        | 0.568                              | 93.50                                                   | 33.173                                                         | 35.5                                                                                    | 17.302                                                | 67.72                                                                     |                                                                     | 0.572                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 5426                                                                     | 71.33                                                                   | 10.00                                                                                                                       | 0.565                              | 95.40                                                   | 33.722                                                         | 35.3                                                                                    | 17.272                                                | 70.57                                                                     |                                                                     | 0.567                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 5426                                                                     | 71.33                                                                   | 10.00                                                                                                                       | 0.565                              | 95.40                                                   | 33.722                                                         | 35.3                                                                                    | 17.272                                                | 71.33                                                                     |                                                                     | 0.565                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6280                                                                     | 60.02                                                                   | 9.84                                                                                                                        | 0.568                              | 62.33                                                   | 3.421                                                          | 5.5                                                                                     | 17.304                                                | 65.68                                                                     |                                                                     | 0.567                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 7134                                                                     | 47.45                                                                   | 9.31                                                                                                                        | 0.577                              | 46.38                                                   | -1.617                                                         | -3.5                                                                                    | 17.406                                                | 53.74                                                                     |                                                                     | 0.573                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 7988                                                                     | 37.57                                                                   | 8.71                                                                                                                        | 0.588                              | 34.79                                                   | -4.250                                                         | -12.2                                                                                   | 17.520                                                | 42.51                                                                     |                                                                     | 0.583                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 8842                                                                     | 30.20                                                                   | 8.02                                                                                                                        | 0.600                              | 26.46                                                   | -5.802                                                         | -21.9                                                                                   | 17.653                                                | 33.88                                                                     |                                                                     | 0.594                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 9696                                                                     | 24.03                                                                   | 7.28                                                                                                                        | 0.613                              | 19.76                                                   | -6.725                                                         | -34.0                                                                                   | 17.794                                                | 27.11                                                                     | 0.12                                                                | 0.606                                  | 2.22E-05                                          | 1.22                                                                                           |                                                                                                        |
|                              | 10550                                                                    | 18.88                                                                   | 6.47                                                                                                                        | 0.627                              | 14.27                                                   | -7.438                                                         | -52.1                                                                                   | 17.950                                                | 21.45                                                                     | 0.09                                                                | 0.620                                  | 2.18E-05                                          | 1.87                                                                                           |                                                                                                        |
|                              | 11404                                                                    | 15.18                                                                   | 5.68                                                                                                                        | 0.640                              | 10.47                                                   | -7.805                                                         | -74.5                                                                                   | 18.102                                                | 17.03                                                                     | 0.06                                                                | 0.634                                  | 1.98E-05                                          | 1.94                                                                                           |                                                                                                        |
|                              | 12258                                                                    | 11.87                                                                   | 4.88                                                                                                                        | 0.654                              | 7.24                                                    | -7.970                                                         | -110.1                                                                                  | 18.255                                                | 13.53                                                                     | 0.06                                                                | 0.647                                  | 1.93E-05                                          | 2.32                                                                                           |                                                                                                        |
| UE                           | 13112                                                                    | 9.14                                                                    | 4.04                                                                                                                        | 0.669                              | 4.70                                                    | -8.053                                                         | -171.4                                                                                  | 18.417                                                | 10.51                                                                     | 0.05                                                                | 0.662                                  | 1.99E-05                                          | 2.54                                                                                           |                                                                                                        |
|                              | 13944                                                                    | 7.14                                                                    | 3.26                                                                                                                        | 0.683                              | 3.05                                                    | -7.885                                                         | -258.9                                                                                  | 18.566                                                | 8.14                                                                      |                                                                     | 0.676                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 13966                                                                    | 7.62                                                                    | 3.26                                                                                                                        | 0.683                              | 3.46                                                    | -7.854                                                         | -227.1                                                                                  | 18.567                                                | 7.38                                                                      |                                                                     | 0.683                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 14266                                                                    | 13.27                                                                   | 3.59                                                                                                                        | 0.677                              | 9.07                                                    | -6.981                                                         | -76.9                                                                                   | 18.503                                                | 10.45                                                                     |                                                                     | 0.680                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 14566                                                                    | 16.75                                                                   | 4.07                                                                                                                        | 0.669                              | 13.46                                                   | -5.220                                                         | -38.8                                                                                   | 18.411                                                | 15.01                                                                     |                                                                     | 0.673                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 14866                                                                    | 20.03                                                                   | 4.60                                                                                                                        | 0.659                              | 18.78                                                   | -1.903                                                         | -10.1                                                                                   | 18.308                                                | 18.39                                                                     |                                                                     | 0.664                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 15166                                                                    | 22.48                                                                   | 5.14                                                                                                                        | 0.650                              | 24.46                                                   | 2.919                                                          | 11.9                                                                                    | 18.206                                                | 21.25                                                                     |                                                                     | 0.655                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 15466                                                                    | 24.66                                                                   | 5.61                                                                                                                        | 0.642                              | 30.08                                                   | 7.756                                                          | 25.8                                                                                    | 18.116                                                | 23.57                                                                     |                                                                     | 0.646                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 15766                                                                    | 27.42                                                                   | 6.08                                                                                                                        | 0.634                              | 35.99                                                   | 12.050                                                         | 33.5                                                                                    | 18.025                                                | 26.04                                                                     |                                                                     | 0.638                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 16066                                                                    | 31.07                                                                   | 6.60                                                                                                                        | 0.625                              | 43.22                                                   | 16.882                                                         | 39.1                                                                                    | 17.925                                                | 29.25                                                                     |                                                                     | 0.629                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 16366                                                                    | 35.21                                                                   | 7.13                                                                                                                        | 0.615                              | 49.91                                                   | 20.340                                                         | 40.8                                                                                    | 17.824                                                | 33.14                                                                     |                                                                     | 0.620                                  |                                                   | 0.28                                                                                           |                                                                                                        |
|                              | 16666                                                                    | 39.29                                                                   | 7.61                                                                                                                        | 0.607                              | 55.50                                                   | 22.438                                                         | 40.4                                                                                    | 17.731                                                | 37.25                                                                     |                                                                     | 0.611                                  |                                                   | 0.41                                                                                           |                                                                                                        |

## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-19B - Depth 145.5 - 147.3 ft  
 Boring B-2302UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-19B - Depth 145.5 - 147.3 ft  
Boring B-2302UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-6 File Name: B-2302UD\_19b  
 Task No.: NA Specific Gravity,  $G_s$ : 2.690 ☒ Meas.; ☐ Assumed Ring No.: 16  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.661  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                               |                                                      |                                |                                   |                                  |                                           |                         |
|---------------------------------------------------------------|------------------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube                      | <input type="checkbox"/> Field Extruded              | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2302UD                                          | <input type="checkbox"/> LPC Core                    |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-19                                             | Compostite No.:                                      |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 145.5 - 147.3                                     | Specimen No.: B                                      |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) =           | Dia. (in.) =            |
| <input checked="" type="checkbox"/> Spec. Selection by X-ray; | <input checked="" type="checkbox"/> Geomarine Sample |                                |                                   | Ref. Effort =                    | % Comp. =                                 | ± Opt. =                |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                  |                                | Mass Moist Soil + Ring (g)                           | 337.50  | 332.99 |
| Container No.                                            | 148                         | 160              | 1156                                        | 189                            | Mass Ring (g)                                        | 215.06  |        |
| Mass Moist Soil + Container (g)                          | 126.12                      | 134.00           | 95.37                                       | 60.14                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 122.44  | 117.93 |
| Mass Dry Soil + Container (g)                            | 108.72                      | 115.60           | 84.47                                       | 55.60                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 30.03                       | 30.55            | 32.26                                       | 30.39                          | Container No.                                        | 859     |        |
| WATER CONTENT (%)                                        | 22.11                       | 21.63            | 20.88                                       | 18.01                          | Mass Dry Soil + Container (g)                        | 31.75   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 21.54                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> Slice ; | Whole Spec.                    | Mass Container (g)                                   | 31.73   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.02    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.060 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 18.960                                                                                                                                                                       | 0.000                                  | 11.080                                    | 12.940                      | Avg. Reading on Soil, $d_{soil}$                        |  | 18.992                                                              | 11.058 |
| 19.020                                                                                                                                                                       | 0.000                                  | 10.950                                    | 12.910                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 12.918 |
| 19.000                                                                                                                                                                       | 0.000                                  | 11.140                                    | 12.920                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 18.992                                                              | 17.200 |
| 18.970                                                                                                                                                                       | 0.000                                  | 11.160                                    | 12.910                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.010                                                                                                                                                                       | 0.000                                  | 10.960                                    | 12.910                      | Initial Height, $H_o$                                   |  | 18.992                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 17.200                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | -1.52                                                               |        |

| Estimated Initial Unit Weight                                          |  |                                    |  | Soil Extruded During Loading                            |      |
|------------------------------------------------------------------------|--|------------------------------------|--|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 127.12                                   |  | Dry, $\gamma_{d,o}$ (pcf) = 104.59 |  | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; |  | <input type="checkbox"/> Other     |  | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ;         |  | <input type="checkbox"/> No        |  | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ;          |  | <input type="checkbox"/> No        |  | Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Pale Brown Lean CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/3/2008 Date: 4/3/2008 Final Calc. By: DH Date: 4/14/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-6 File Name: B-2302UD\_19b  
 Task No.: NA Specific Gravity,  $G_s$ : 2.690 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 22.11                    | 100.27                   | 97.5                         | 103.4                 | 109.2 |
| 2                | " Bottom, W2          | 21.63                    | 100.66                   | 96.4                         | 101.9                 | 107.7 |
| 3                | " Sides, W3           | 20.88                    | 101.29                   | 94.5                         | 99.6                  | 105.4 |
| 4                | " Average, W4         | 21.54                    | 100.74                   | 96.1                         | 101.7                 | 107.5 |
| 5                | " Back Calculated (1) | 22.50                    | 99.95 (3)                | 98.3                         | 104.5                 | 110.4 |
| 6                | Final                 | 18.01                    | 99.95 (2)                | 98.3                         | 104.5                 | 110.4 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.747</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.719</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11763 |
| Final Selected, $K_f$                                                           | 0.11763 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>101.19</u>                                                                |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>100.57</u>                                         |  |                              |

| Summary of Specimen Physical Properties |                      |               |                             |                                     |                                   |                                                                |                                                                        |                                            |  |
|-----------------------------------------|----------------------|---------------|-----------------------------|-------------------------------------|-----------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------|--|
| Specific Gravity                        |                      |               | Assumed                     |                                     |                                   | To make $S_f = 100\%$ at end of test.                          |                                                                        |                                            |  |
| $G_s = 2.690$                           |                      | X             | Measured                    |                                     |                                   | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_f = 100\%$ |                                                                        |                                            |  |
| Mass Dry Soil, (g)                      | Initial: 99.95       |               | X                           | From Cal. Routine No.               |                                   | 5                                                              | Note: Routine #5 is based on final measurements.                       |                                            |  |
|                                         | Final (4): NA        |               |                             | Make $S_f = 100\%$ , or;            |                                   |                                                                | Avg. of measured & make $S_f = 100\%$                                  |                                            |  |
| Initial Height (mm) =                   |                      |               | 18.99                       | X                                   | Measured ;                        |                                                                |                                                                        | Back Calculated Back-cal. Sat. (%) = NA    |  |
| Final Height (mm) =                     |                      |               | 17.20                       | X                                   | Measured ;                        |                                                                |                                                                        | Initial $H_o$ & dial change during loading |  |
|                                         | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf) | Height of Solids, $H_s$ (2,4) (mm)                             | Extruded soil loss proportioned in increasing loading increments (5) : |                                            |  |
| Initial                                 | 22.5                 | 0.615         | 98.3                        | 127.1                               | 103.8                             | 11.757                                                         | From                                                                   | To (ksf)                                   |  |
| Final                                   | 18.0                 | 0.463         | 104.5                       | 135.2                               | 114.6                             | NA                                                             | NA                                                                     | NA                                         |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 49 | Minus 200 (%) |
| Casagrande Method      | 30.00             | NA                                | 0.155 | 0.040 | 2.4 | Plastic Limit (PL)    | 15 | 95.8          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 34 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP HP  
 Date: 4/16/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-6 File Name: B-2302UD\_19b  
 Task No.: NA Date; Start: 4/3/2008 Initial Height,  $H_o$  (mm): 18.99  
 Project Name: Exelon (Victoria) Completed: 4/14/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6608  
 Test: Initial / Pressure Gauge Back Pressure,  $U_g$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.1088,  $V$ : 0.023004734 Piston Uplift,  $P_{up}$  (lbf): 34.42  
 Back Pressure,  $U_{b, CS}$  (psi): 70.09251,  $V$ : 0.022999357 Setup  $DT_{ref}$  (V): 0.001638443  
 Displacement Transducer No.: DT-025 Calib. Factor (mm/V): 228.61978 Ch. No.: 2  
 Pore Press. Transducer No.: PT-112 Calib. Factor (psi/V): 3029.91431 Ref. Zero (V): -0.000134 Ch. No.: 3  
 Force Cell No.: FT-100 Calib. Factor (lbf/V): -468015.73 Ref. Zero (V): -0.000467 Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| S                            | 94                    | 15 : 10 : 22         |                                                                    | 0.24                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                 |
| BS                           | 94                    | 15 : 37 : 30         |                                                                    | 1.31                                                        |                                                            | 0.039                                                         | 0.000                                                                 | 0.039                                                                   |                                                                                 |
| BE                           | 95                    | 08 : 51 : 17         |                                                                    | 1.86                                                        | 0.002                                                      | 0.033                                                         | 0.000                                                                 | 0.033                                                                   |                                                                                 |
| CS                           | 95                    | 08 : 51 : 20         | 0                                                                  | 1.88                                                        | 0.000                                                      | 0.033                                                         | 0.000                                                                 | 0.033                                                                   |                                                                                 |
|                              | 95                    | 09 : 58 : 24         | 67                                                                 | 3.31                                                        | 0.394                                                      | 0.075                                                         | 0.000                                                                 | 0.075                                                                   | 0.202                                                                           |
|                              | 95                    | 12 : 43 : 26         | 232                                                                | 5.08                                                        | 0.618                                                      | 0.171                                                         | 0.000                                                                 | 0.171                                                                   | 0.182                                                                           |
| US                           | 95                    | 15 : 28 : 28         | 397                                                                | 7.06                                                        | 0.744                                                      | 0.271                                                         | 0.000                                                                 | 0.271                                                                   | 0.192                                                                           |
|                              | 95                    | 18 : 13 : 29         | 562                                                                | 9.39                                                        | 0.860                                                      | 0.367                                                         | 0.000                                                                 | 0.367                                                                   | 0.184                                                                           |
|                              | 95                    | 20 : 58 : 30         | 727                                                                | 12.01                                                       | 0.940                                                      | 0.459                                                         | 0.000                                                                 | 0.459                                                                   | 0.175                                                                           |
|                              | 95                    | 23 : 43 : 31         | 892                                                                | 14.89                                                       | 1.042                                                      | 0.547                                                         | 0.000                                                                 | 0.547                                                                   | 0.169                                                                           |
|                              | 96                    | 02 : 28 : 32         | 1057                                                               | 18.24                                                       | 1.274                                                      | 0.640                                                         | 0.000                                                                 | 0.640                                                                   | 0.177                                                                           |
|                              | 96                    | 05 : 13 : 33         | 1222                                                               | 21.75                                                       | 1.428                                                      | 0.735                                                         | 0.000                                                                 | 0.735                                                                   | 0.182                                                                           |
|                              | 96                    | 07 : 58 : 34         | 1387                                                               | 24.87                                                       | 1.563                                                      | 0.825                                                         | 0.000                                                                 | 0.825                                                                   | 0.173                                                                           |
|                              | 96                    | 10 : 43 : 36         | 1552                                                               | 27.83                                                       | 1.605                                                      | 0.907                                                         | 0.000                                                                 | 0.907                                                                   | 0.158                                                                           |
|                              | 96                    | 13 : 28 : 37         | 1717                                                               | 30.97                                                       | 1.697                                                      | 0.992                                                         | 0.000                                                                 | 0.992                                                                   | 0.162                                                                           |
|                              | 96                    | 16 : 13 : 38         | 1882                                                               | 34.68                                                       | 2.124                                                      | 1.087                                                         | 0.000                                                                 | 1.087                                                                   | 0.181                                                                           |
|                              | 96                    | 18 : 58 : 40         | 2047                                                               | 38.07                                                       | 2.317                                                      | 1.181                                                         | 0.000                                                                 | 1.181                                                                   | 0.181                                                                           |
|                              | 96                    | 21 : 43 : 42         | 2212                                                               | 41.48                                                       | 2.563                                                      | 1.272                                                         | 0.000                                                                 | 1.272                                                                   | 0.174                                                                           |
|                              | 97                    | 00 : 28 : 43         | 2377                                                               | 44.85                                                       | 2.713                                                      | 1.360                                                         | 0.000                                                                 | 1.360                                                                   | 0.169                                                                           |
|                              | 97                    | 04 : 13 : 44         | 2602                                                               | 48.35                                                       | 2.994                                                      | 1.444                                                         | 0.000                                                                 | 1.444                                                                   | 0.118                                                                           |
|                              | 97                    | 06 : 58 : 46         | 2767                                                               | 52.69                                                       | 3.539                                                      | 1.536                                                         | 0.000                                                                 | 1.536                                                                   | 0.175                                                                           |
|                              | 97                    | 09 : 43 : 47         | 2932                                                               | 56.80                                                       | 3.896                                                      | 1.628                                                         | 0.000                                                                 | 1.628                                                                   | 0.177                                                                           |
|                              | 97                    | 12 : 28 : 49         | 3097                                                               | 60.99                                                       | 4.124                                                      | 1.715                                                         | 0.000                                                                 | 1.715                                                                   | 0.167                                                                           |
|                              | 97                    | 15 : 13 : 51         | 3263                                                               | 65.59                                                       | 4.286                                                      | 1.802                                                         | 0.000                                                                 | 1.802                                                                   | 0.167                                                                           |



**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| UE                           | 97                    | 17 : 58 : 53         | 3428                                                               | 70.33                                                       | 4.928                                                      | 1.883                                                         | 0.000                                                                 | 1.883                                                                   | 0.154                                                                           |
|                              | 97                    | 18 : 30 : 42         | 3459                                                               | 70.93                                                       | 5.286                                                      | 1.899                                                         | 0.000                                                                 | 1.899                                                                   | 0.163                                                                           |
|                              | 97                    | 18 : 43 : 53         | 3473                                                               | 69.70                                                       | 4.949                                                      | 1.901                                                         | 0.000                                                                 | 1.901                                                                   | 0.030                                                                           |
|                              | 97                    | 23 : 28 : 56         | 3758                                                               | 52.19                                                       | 0.136                                                      | 1.886                                                         | 0.000                                                                 | 1.886                                                                   | -0.016                                                                          |
|                              | 98                    | 04 : 13 : 59         | 4043                                                               | 40.27                                                       | -0.714                                                     | 1.856                                                         | 0.000                                                                 | 1.856                                                                   | -0.033                                                                          |
|                              | 98                    | 08 : 59 : 01         | 4328                                                               | 31.06                                                       | -1.232                                                     | 1.815                                                         | 0.000                                                                 | 1.815                                                                   | -0.046                                                                          |
|                              | 98                    | 13 : 44 : 04         | 4613                                                               | 23.72                                                       | -1.675                                                     | 1.759                                                         | 0.000                                                                 | 1.759                                                                   | -0.061                                                                          |
| US                           | 98                    | 18 : 29 : 07         | 4898                                                               | 18.10                                                       | -1.953                                                     | 1.695                                                         | 0.000                                                                 | 1.695                                                                   | -0.071                                                                          |
|                              | 98                    | 23 : 14 : 10         | 5183                                                               | 13.94                                                       | -2.119                                                     | 1.622                                                         | 0.000                                                                 | 1.622                                                                   | -0.080                                                                          |
|                              | 99                    | 03 : 59 : 12         | 5468                                                               | 10.96                                                       | -2.069                                                     | 1.551                                                         | 0.000                                                                 | 1.551                                                                   | -0.080                                                                          |
|                              | 99                    | 08 : 44 : 15         | 5753                                                               | 8.65                                                        | -2.014                                                     | 1.477                                                         | 0.000                                                                 | 1.477                                                                   | -0.081                                                                          |
|                              | 99                    | 13 : 29 : 18         | 6038                                                               | 7.20                                                        | -1.852                                                     | 1.415                                                         | 0.000                                                                 | 1.415                                                                   | -0.069                                                                          |
| UE                           | 99                    | 18 : 04 : 46         | 6313                                                               | 5.56                                                        | -1.904                                                     | 1.340                                                         | 0.000                                                                 | 1.340                                                                   | -0.086                                                                          |
|                              | 99                    | 18 : 14 : 21         | 6323                                                               | 5.79                                                        | -1.843                                                     | 1.338                                                         | 0.000                                                                 | 1.338                                                                   | -0.057                                                                          |
|                              | 99                    | 20 : 59 : 23         | 6488                                                               | 12.30                                                       | 1.252                                                      | 1.391                                                         | 0.000                                                                 | 1.391                                                                   | 0.102                                                                           |
|                              | 99                    | 23 : 44 : 24         | 6653                                                               | 17.55                                                       | 2.925                                                      | 1.474                                                         | 0.000                                                                 | 1.474                                                                   | 0.157                                                                           |
|                              | 100                   | 02 : 29 : 25         | 6818                                                               | 22.58                                                       | 3.579                                                      | 1.550                                                         | 0.000                                                                 | 1.550                                                                   | 0.146                                                                           |
| US                           | 100                   | 05 : 14 : 27         | 6983                                                               | 28.60                                                       | 4.190                                                      | 1.629                                                         | 0.000                                                                 | 1.629                                                                   | 0.152                                                                           |
|                              | 100                   | 07 : 59 : 29         | 7148                                                               | 35.29                                                       | 4.430                                                      | 1.708                                                         | 0.000                                                                 | 1.708                                                                   | 0.150                                                                           |
|                              | 100                   | 10 : 44 : 30         | 7313                                                               | 42.75                                                       | 4.339                                                      | 1.780                                                         | 0.000                                                                 | 1.780                                                                   | 0.139                                                                           |
|                              | 100                   | 13 : 29 : 32         | 7478                                                               | 50.49                                                       | 4.113                                                      | 1.848                                                         | 0.000                                                                 | 1.848                                                                   | 0.130                                                                           |
|                              | 100                   | 16 : 14 : 34         | 7643                                                               | 58.89                                                       | 4.061                                                      | 1.915                                                         | 0.000                                                                 | 1.915                                                                   | 0.128                                                                           |
|                              | 100                   | 18 : 59 : 36         | 7808                                                               | 67.92                                                       | 4.913                                                      | 1.984                                                         | 0.000                                                                 | 1.984                                                                   | 0.133                                                                           |
|                              | 100                   | 21 : 44 : 38         | 7973                                                               | 75.85                                                       | 5.841                                                      | 2.057                                                         | 0.000                                                                 | 2.057                                                                   | 0.139                                                                           |
|                              | 101                   | 00 : 29 : 39         | 8138                                                               | 82.82                                                       | 6.594                                                      | 2.132                                                         | 0.000                                                                 | 2.132                                                                   | 0.143                                                                           |
|                              | 101                   | 03 : 14 : 41         | 8303                                                               | 88.88                                                       | 7.119                                                      | 2.205                                                         | 0.000                                                                 | 2.205                                                                   | 0.141                                                                           |
|                              | 101                   | 05 : 59 : 42         | 8468                                                               | 94.98                                                       | 7.710                                                      | 2.276                                                         | 0.000                                                                 | 2.276                                                                   | 0.135                                                                           |
|                              | 101                   | 08 : 44 : 43         | 8633                                                               | 102.33                                                      | 8.567                                                      | 2.355                                                         | 0.000                                                                 | 2.355                                                                   | 0.152                                                                           |
|                              | 101                   | 11 : 29 : 45         | 8798                                                               | 109.14                                                      | 9.311                                                      | 2.436                                                         | 0.000                                                                 | 2.436                                                                   | 0.155                                                                           |
|                              | 101                   | 14 : 14 : 46         | 8963                                                               | 115.87                                                      | 9.690                                                      | 2.515                                                         | 0.000                                                                 | 2.515                                                                   | 0.152                                                                           |
|                              | 101                   | 16 : 59 : 48         | 9128                                                               | 122.26                                                      | 10.154                                                     | 2.586                                                         | 0.000                                                                 | 2.586                                                                   | 0.136                                                                           |
|                              | 101                   | 19 : 44 : 50         | 9294                                                               | 129.39                                                      | 10.503                                                     | 2.656                                                         | 0.000                                                                 | 2.656                                                                   | 0.133                                                                           |
|                              | 101                   | 22 : 29 : 52         | 9459                                                               | 137.49                                                      | 11.502                                                     | 2.729                                                         | 0.000                                                                 | 2.729                                                                   | 0.141                                                                           |
| UE                           | 102                   | 01 : 14 : 54         | 9624                                                               | 145.64                                                      | 12.130                                                     | 2.802                                                         | 0.000                                                                 | 2.802                                                                   | 0.139                                                                           |
|                              | 102                   | 03 : 50 : 59         | 9780                                                               | 153.31                                                      | 12.131                                                     | 2.869                                                         | 0.000                                                                 | 2.869                                                                   | 0.135                                                                           |
|                              | 102                   | 03 : 59 : 55         | 9789                                                               | 152.53                                                      | 11.905                                                     | 2.871                                                         | 0.000                                                                 | 2.871                                                                   | 0.071                                                                           |
|                              | 102                   | 11 : 45 : 00         | 10254                                                              | 118.19                                                      | 1.711                                                      | 2.863                                                         | 0.000                                                                 | 2.863                                                                   | -0.005                                                                          |
|                              | 102                   | 19 : 30 : 03         | 10719                                                              | 90.20                                                       | -0.519                                                     | 2.825                                                         | 0.000                                                                 | 2.825                                                                   | -0.026                                                                          |
|                              | 103                   | 03 : 15 : 09         | 11184                                                              | 68.63                                                       | -1.441                                                     | 2.778                                                         | 0.000                                                                 | 2.778                                                                   | -0.032                                                                          |
|                              | 103                   | 11 : 00 : 15         | 11649                                                              | 51.89                                                       | -2.525                                                     | 2.717                                                         | 0.000                                                                 | 2.717                                                                   | -0.041                                                                          |
| US                           | 103                   | 18 : 45 : 18         | 12114                                                              | 38.05                                                       | -3.548                                                     | 2.636                                                         | 0.000                                                                 | 2.636                                                                   | -0.055                                                                          |
|                              | 104                   | 02 : 30 : 22         | 12579                                                              | 27.37                                                       | -4.245                                                     | 2.541                                                         | 0.000                                                                 | 2.541                                                                   | -0.065                                                                          |

## CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-6 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2302UD\_11  
 Task No.: NA Date: Start: 4/3/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.1 Piston Uplift,  $P_{up}$  (lbf): 34.42  
 Project Name: Exelon (Victoria) Completed: 4/14/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$   
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Pale Brown Lean CLAY (CH) 0

Ring No.: 16 Area,  $A_r$  (cm<sup>2</sup>): 31.661 Solids Ht.,  $H_s$  (mm): 11.757 Specific Gravity,  $G_s = 2.690$  ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 18.99 Water 22.5 Void 0.615 Deg. of 98.3 Total Unit 127.1 Dry Unit 103.8  
**Final:** (mm):  $H_f$ : 17.20 Content,  $w$  (%): 18.0 Ratio,  $e$ : 0.463 Sat.,  $S$  (%): 104.5 Weight,  $\gamma_t$  (pcf): 135.2 Weight,  $\gamma_d$  (pcf): 114.6

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *HP*

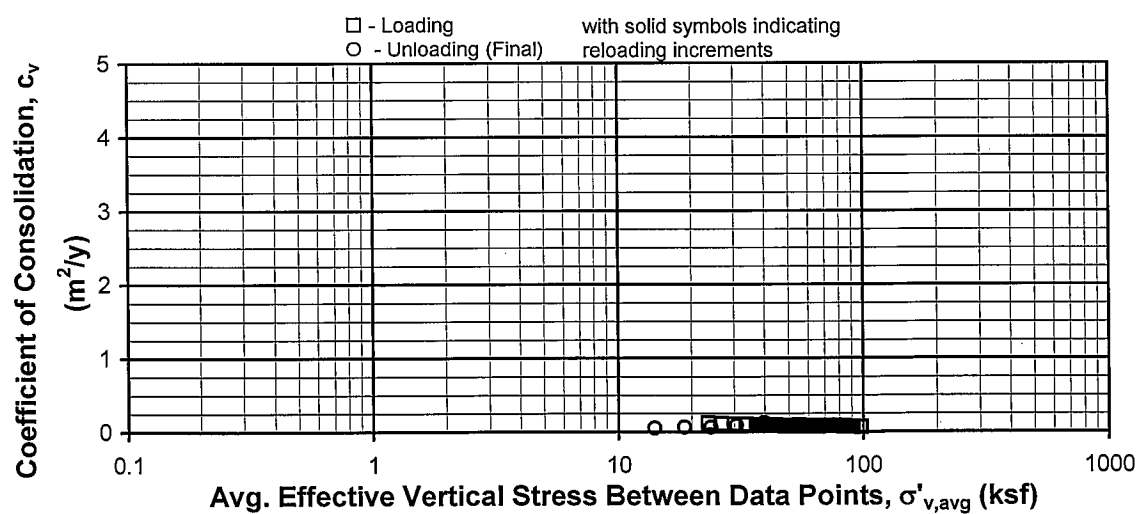
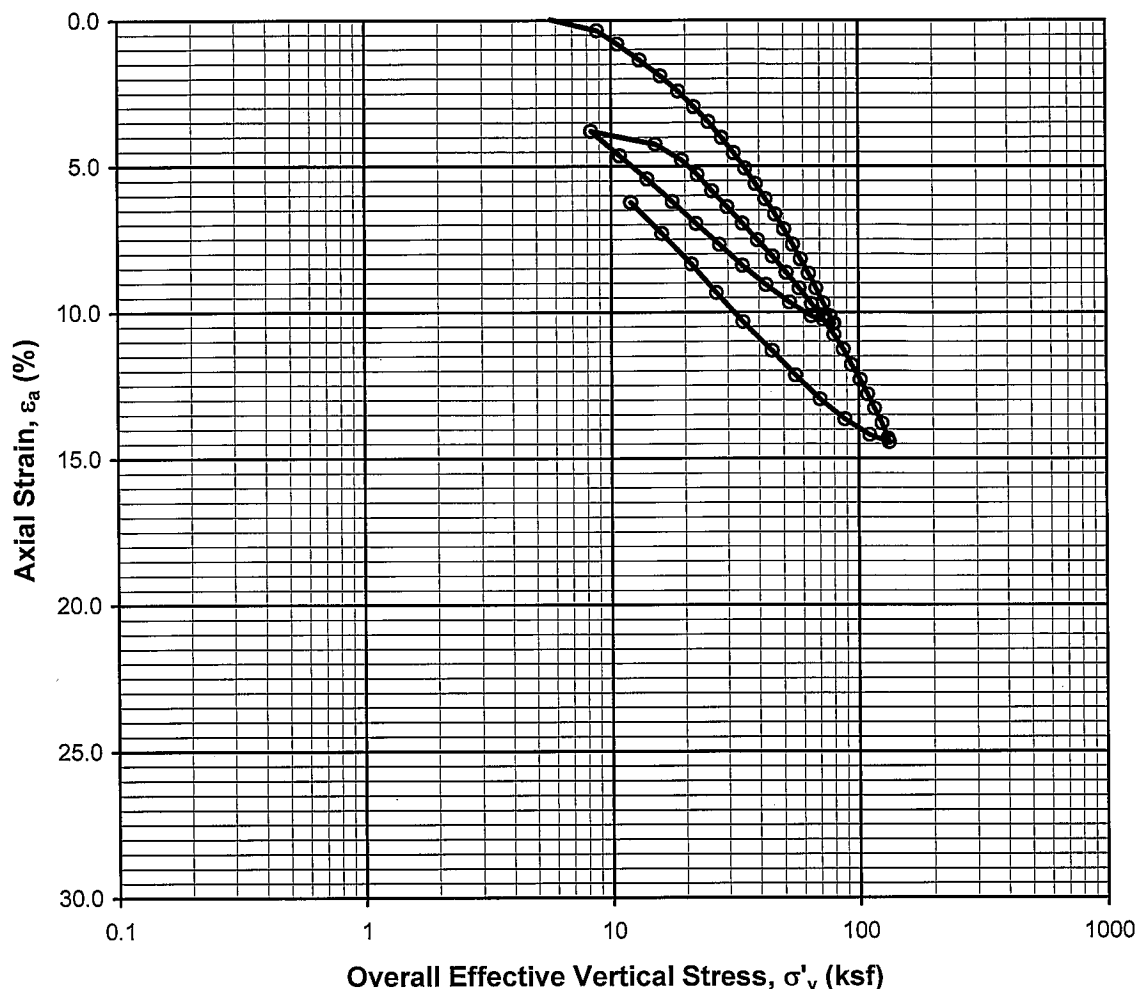
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n} (\epsilon_{ac,n})$<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n (2)$<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                   |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                   |                                    | 0.24                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | 0.20                                                                                                              | 0.612                              | 1.31                                                    |                                                                |                                                                                         | 18.953                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 1.86                                                                    | 0.17                                                                                                              | 0.613                              | 1.86                                                    | 0.002                                                          | 0.1                                                                                     | 18.959                                                |                                                                           |                                                                     | 0.612                                  |                                                   |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 1.88                                                                    | 0.17                                                                                                              | 0.613                              | 1.88                                                    | 0.000                                                          | 0.0                                                                                     | 18.959                                                |                                                                           |                                                                     | 0.613                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 67                                                                       | 3.05                                                                    | 0.40                                                                                                              | 0.609                              | 3.31                                                    | 0.394                                                          | 11.9                                                                                    | 18.917                                                | 2.47                                                                      |                                                                     | 0.611                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 232                                                                      | 4.66                                                                    | 0.90                                                                                                              | 0.601                              | 5.08                                                    | 0.618                                                          | 12.2                                                                                    | 18.821                                                | 3.85                                                                      |                                                                     | 0.605                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 397                                                                      | 6.56                                                                    | 1.43                                                                                                              | 0.592                              | 7.06                                                    | 0.744                                                          | 10.5                                                                                    | 18.721                                                | 5.61                                                                      |                                                                     | 0.597                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 562                                                                      | 8.81                                                                    | 1.93                                                                                                              | 0.584                              | 9.39                                                    | 0.860                                                          | 9.2                                                                                     | 18.625                                                | 7.68                                                                      | 1.54                                                                | 0.588                                  | 7.26E-04                                          | 2.78                                                                                           |                                                                                                  |
|                              | 727                                                                      | 11.37                                                                   | 2.41                                                                                                              | 0.576                              | 12.01                                                   | 0.940                                                          | 7.8                                                                                     | 18.533                                                | 10.09                                                                     | 1.54                                                                | 0.580                                  | 6.10E-04                                          | 5.59                                                                                           |                                                                                                  |
|                              | 892                                                                      | 14.19                                                                   | 2.88                                                                                                              | 0.569                              | 14.89                                                   | 1.042                                                          | 7.0                                                                                     | 18.445                                                | 12.78                                                                     | 1.53                                                                | 0.573                                  | 5.29E-04                                          | 8.45                                                                                           |                                                                                                  |
|                              | 1057                                                                     | 17.38                                                                   | 3.37                                                                                                              | 0.561                              | 18.24                                                   | 1.274                                                          | 7.0                                                                                     | 18.352                                                | 15.79                                                                     | 1.51                                                                | 0.565                                  | 4.69E-04                                          | 11.19                                                                                          |                                                                                                  |
|                              | 1222                                                                     | 20.79                                                                   | 3.87                                                                                                              | 0.553                              | 21.75                                                   | 1.428                                                          | 6.6                                                                                     | 18.257                                                | 19.09                                                                     | 1.34                                                                | 0.557                                  | 4.08E-04                                          | 12.58                                                                                          |                                                                                                  |
|                              | 1387                                                                     | 23.81                                                                   | 4.34                                                                                                              | 0.545                              | 24.87                                                   | 1.563                                                          | 6.3                                                                                     | 18.167                                                | 22.30                                                                     | 1.07                                                                | 0.549                                  | 3.47E-04                                          | 12.10                                                                                          |                                                                                                  |
|                              | 1552                                                                     | 26.75                                                                   | 4.78                                                                                                              | 0.538                              | 27.83                                                   | 1.605                                                          | 5.8                                                                                     | 18.085                                                | 25.28                                                                     | 0.95                                                                | 0.542                                  | 2.96E-04                                          | 12.70                                                                                          |                                                                                                  |
|                              | 1717                                                                     | 29.83                                                                   | 5.22                                                                                                              | 0.531                              | 30.97                                                   | 1.697                                                          | 5.5                                                                                     | 18.000                                                | 28.29                                                                     | 0.96                                                                | 0.535                                  | 2.89E-04                                          | 14.81                                                                                          |                                                                                                  |
|                              | 1882                                                                     | 33.25                                                                   | 5.72                                                                                                              | 0.523                              | 34.68                                                   | 2.124                                                          | 6.1                                                                                     | 17.905                                                | 31.54                                                                     | 0.97                                                                | 0.527                                  | 2.75E-04                                          | 17.01                                                                                          |                                                                                                  |
|                              | 2047                                                                     | 36.51                                                                   | 6.22                                                                                                              | 0.515                              | 38.07                                                   | 2.317                                                          | 6.1                                                                                     | 17.811                                                | 34.88                                                                     | 0.75                                                                | 0.519                                  | 2.35E-04                                          | 14.77                                                                                          |                                                                                                  |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

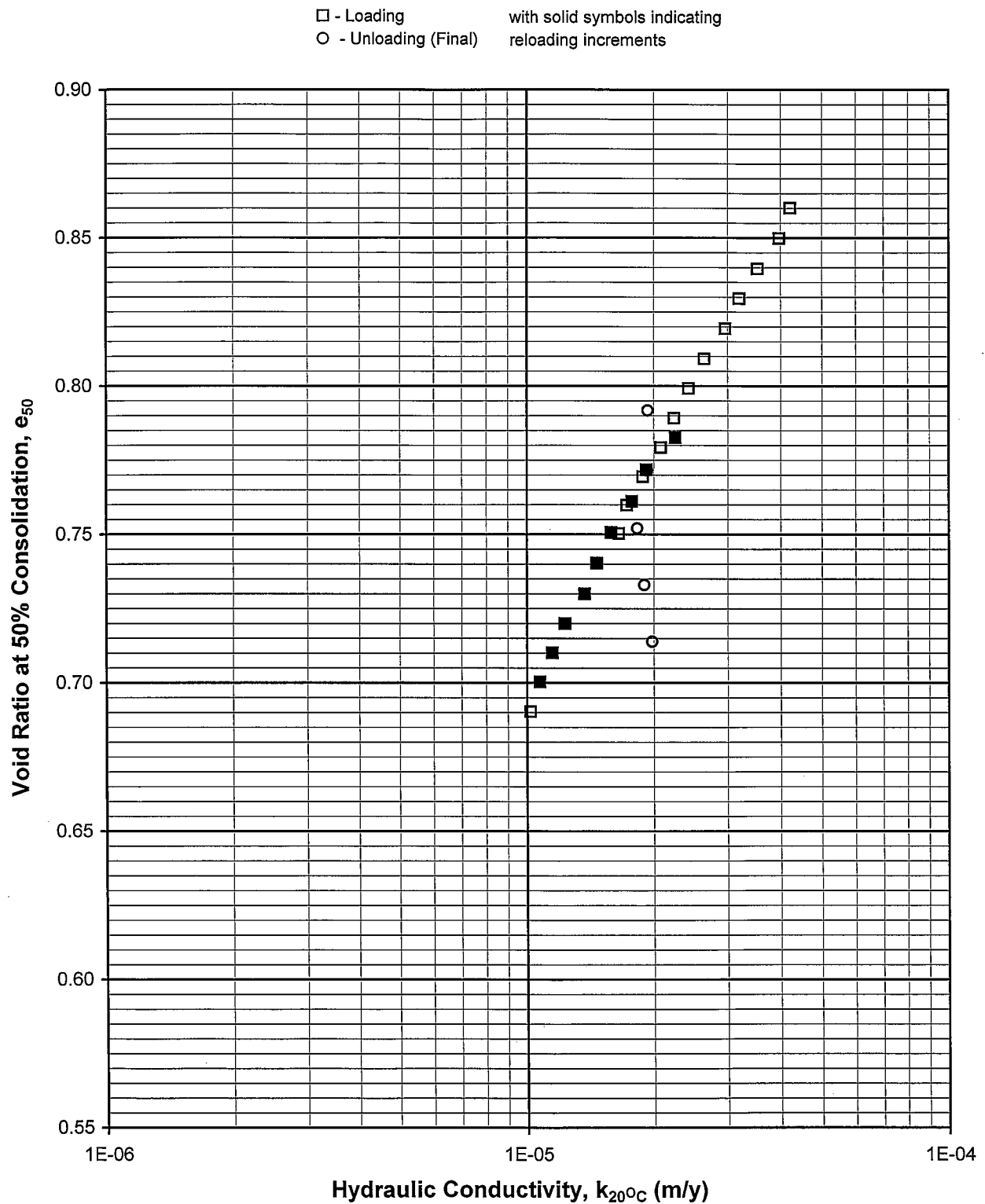
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 2212                                                                     | 39.75                                                                   | 6.70                                                                                                                        | 0.507                              | 41.48                                                   | 2.563                                                          | 6.2                                                                                     | 17.720                                                | 38.13                                                                     | 0.68                                                        | 0.511                                  | 2.04E-04                                          | 14.90                                                                                          |                                                                                                        |
|                              | 2377                                                                     | 43.02                                                                   | 7.16                                                                                                                        | 0.500                              | 44.85                                                   | 2.713                                                          | 6.0                                                                                     | 17.632                                                | 41.38                                                                     | 0.62                                                        | 0.503                                  | 1.81E-04                                          | 14.86                                                                                          |                                                                                                        |
|                              | 2602                                                                     | 46.33                                                                   | 7.60                                                                                                                        | 0.493                              | 48.35                                                   | 2.994                                                          | 6.2                                                                                     | 17.548                                                | 44.68                                                                     | 0.43                                                        | 0.496                                  | 1.16E-04                                          | 11.67                                                                                          |                                                                                                        |
|                              | 2767                                                                     | 50.30                                                                   | 8.09                                                                                                                        | 0.485                              | 52.69                                                   | 3.539                                                          | 6.7                                                                                     | 17.456                                                | 48.32                                                                     | 0.63                                                        | 0.489                                  | 1.49E-04                                          | 18.45                                                                                          |                                                                                                        |
|                              | 2932                                                                     | 54.18                                                                   | 8.57                                                                                                                        | 0.477                              | 56.80                                                   | 3.896                                                          | 6.9                                                                                     | 17.364                                                | 52.24                                                                     | 0.52                                                        | 0.481                                  | 1.30E-04                                          | 16.44                                                                                          |                                                                                                        |
|                              | 3097                                                                     | 58.21                                                                   | 9.03                                                                                                                        | 0.469                              | 60.99                                                   | 4.124                                                          | 6.8                                                                                     | 17.277                                                | 56.19                                                                     | 0.48                                                        | 0.473                                  | 1.13E-04                                          | 16.51                                                                                          |                                                                                                        |
|                              | 3263                                                                     | 62.70                                                                   | 9.49                                                                                                                        | 0.462                              | 65.59                                                   | 4.286                                                          | 6.5                                                                                     | 17.190                                                | 60.46                                                                     | 0.50                                                        | 0.466                                  | 1.07E-04                                          | 18.35                                                                                          |                                                                                                        |
| UE                           | 3428                                                                     | 67.00                                                                   | 9.91                                                                                                                        | 0.455                              | 70.33                                                   | 4.928                                                          | 7.0                                                                                     | 17.109                                                | 64.85                                                                     | 0.47                                                        | 0.459                                  | 8.93E-05                                          | 18.25                                                                                          |                                                                                                        |
|                              | 3459                                                                     | 67.36                                                                   | 10.00                                                                                                                       | 0.454                              | 70.93                                                   | 5.286                                                          | 7.5                                                                                     | 17.093                                                | 67.18                                                                     |                                                             | 0.455                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3473                                                                     | 66.36                                                                   | 10.01                                                                                                                       | 0.454                              | 69.70                                                   | 4.949                                                          | 7.1                                                                                     | 17.091                                                | 66.86                                                                     |                                                             | 0.454                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3758                                                                     | 52.09                                                                   | 9.93                                                                                                                        | 0.455                              | 52.19                                                   | 0.136                                                          | 0.3                                                                                     | 17.106                                                | 59.23                                                                     |                                                             | 0.454                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 4043                                                                     | 40.74                                                                   | 9.77                                                                                                                        | 0.457                              | 40.27                                                   | -0.714                                                         | -1.8                                                                                    | 17.136                                                | 46.42                                                                     |                                                             | 0.456                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 4328                                                                     | 31.88                                                                   | 9.55                                                                                                                        | 0.461                              | 31.06                                                   | -1.232                                                         | -4.0                                                                                    | 17.177                                                | 36.31                                                                     |                                                             | 0.459                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 4613                                                                     | 24.83                                                                   | 9.26                                                                                                                        | 0.466                              | 23.72                                                   | -1.675                                                         | -7.1                                                                                    | 17.233                                                | 28.35                                                                     |                                                             | 0.463                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 4898                                                                     | 19.38                                                                   | 8.92                                                                                                                        | 0.471                              | 18.10                                                   | -1.953                                                         | -10.8                                                                                   | 17.297                                                | 22.10                                                                     |                                                             | 0.468                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 5183                                                                     | 15.32                                                                   | 8.54                                                                                                                        | 0.477                              | 13.94                                                   | -2.119                                                         | -15.2                                                                                   | 17.370                                                | 17.35                                                                     | 0.60                                                        | 0.474                                  | 1.04E-04                                          | 2.18                                                                                           |                                                                                                        |
|                              | 5468                                                                     | 12.30                                                                   | 8.16                                                                                                                        | 0.483                              | 10.96                                                   | -2.069                                                         | -18.9                                                                                   | 17.441                                                | 13.81                                                                     | 0.43                                                        | 0.480                                  | 1.01E-04                                          | 3.10                                                                                           |                                                                                                        |
|                              | 5753                                                                     | 9.95                                                                    | 7.78                                                                                                                        | 0.490                              | 8.65                                                    | -2.014                                                         | -23.3                                                                                   | 17.515                                                | 11.12                                                                     | 0.35                                                        | 0.487                                  | 1.05E-04                                          | 3.75                                                                                           |                                                                                                        |
|                              | 6038                                                                     | 8.39                                                                    | 7.45                                                                                                                        | 0.495                              | 7.20                                                    | -1.852                                                         | -25.7                                                                                   | 17.577                                                | 9.17                                                                      | 0.24                                                        | 0.492                                  | 9.50E-05                                          | 3.36                                                                                           |                                                                                                        |
| UE                           | 6313                                                                     | 6.76                                                                    | 7.05                                                                                                                        | 0.501                              | 5.56                                                    | -1.904                                                         | -34.3                                                                                   | 17.652                                                | 7.58                                                                      | 0.30                                                        | 0.498                                  | 1.23E-04                                          | 5.17                                                                                           |                                                                                                        |
|                              | 6323                                                                     | 6.96                                                                    | 7.04                                                                                                                        | 0.502                              | 5.79                                                    | -1.843                                                         | -31.8                                                                                   | 17.654                                                | 6.86                                                                      |                                                             | 0.501                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6488                                                                     | 11.45                                                                   | 7.33                                                                                                                        | 0.497                              | 12.30                                                   | 1.252                                                          | 10.2                                                                                    | 17.601                                                | 9.21                                                                      |                                                             | 0.499                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6653                                                                     | 15.54                                                                   | 7.76                                                                                                                        | 0.490                              | 17.55                                                   | 2.925                                                          | 16.7                                                                                    | 17.518                                                | 13.50                                                                     |                                                             | 0.494                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6818                                                                     | 20.13                                                                   | 8.16                                                                                                                        | 0.483                              | 22.58                                                   | 3.579                                                          | 15.9                                                                                    | 17.442                                                | 17.83                                                                     |                                                             | 0.487                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 6983                                                                     | 25.74                                                                   | 8.58                                                                                                                        | 0.477                              | 28.60                                                   | 4.190                                                          | 14.7                                                                                    | 17.363                                                | 22.93                                                                     |                                                             | 0.480                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 7148                                                                     | 32.28                                                                   | 8.99                                                                                                                        | 0.470                              | 35.29                                                   | 4.430                                                          | 12.6                                                                                    | 17.284                                                | 29.01                                                                     | 0.69                                                        | 0.473                                  | 9.59E-05                                          | 1.45                                                                                           |                                                                                                        |
|                              | 7313                                                                     | 39.81                                                                   | 9.37                                                                                                                        | 0.464                              | 42.75                                                   | 4.339                                                          | 10.1                                                                                    | 17.212                                                | 36.04                                                                     | 0.76                                                        | 0.467                                  | 8.61E-05                                          | 3.22                                                                                           |                                                                                                        |
|                              | 7478                                                                     | 47.71                                                                   | 9.73                                                                                                                        | 0.458                              | 50.49                                                   | 4.113                                                          | 8.1                                                                                     | 17.144                                                | 43.76                                                                     | 0.82                                                        | 0.461                                  | 8.26E-05                                          | 5.25                                                                                           |                                                                                                        |
|                              | 7643                                                                     | 56.16                                                                   | 10.08                                                                                                                       | 0.452                              | 58.89                                                   | 4.061                                                          | 6.9                                                                                     | 17.077                                                | 51.93                                                                     | 0.92                                                        | 0.455                                  | 8.30E-05                                          | 7.93                                                                                           |                                                                                                        |
|                              | 7808                                                                     | 64.60                                                                   | 10.45                                                                                                                       | 0.447                              | 67.92                                                   | 4.913                                                          | 7.2                                                                                     | 17.008                                                | 60.38                                                                     | 0.90                                                        | 0.450                                  | 7.78E-05                                          | 9.71                                                                                           |                                                                                                        |

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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-8A - Depth 83.5 - 85.5 ft  
 Boring B-2304UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-8A - Depth 83.5 - 85.5 ft  
Boring B-2304UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-7 File Name: B-2304\_UD8a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Meas. ; ☐ Assumed Ring No.: 7  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.684  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                               |                                                      |                                |                                   |                                  |                                           |                         |
|---------------------------------------------------------------|------------------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube                      | <input type="checkbox"/> Field Extruded              | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2304UD                                          | <input type="checkbox"/> LPC Core                    |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-8                                              | Composite No.:                                       |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 83.5 - 85.5                                       | Specimen No.: A                                      |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) =           | Dia. (in.) =            |
| <input checked="" type="checkbox"/> Spec. Selection by X-ray; | <input checked="" type="checkbox"/> Geomarine Sample |                                |                                   | Ref. Effort =                    | % Comp. =                                 | ± Opt. =                |

| Water<br>Content (W);              | Initial - Trimming Location                              |                         |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial                                     | Final  |
|------------------------------------|----------------------------------------------------------|-------------------------|------------|---------------------------------------|------------------------------------------------------------|---------------------------------------------|--------|
|                                    | Top (W1)                                                 | Bottom (W2)             | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 330.96                                      | 328.66 |
| Container No.                      | 902                                                      | 2018                    | 2020       | 959                                   | Mass Ring (g)                                              | 215.66                                      |        |
| Mass Moist Soil + Container (g)    | 129.14                                                   | 129.17                  | 85.00      | 58.34                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 115.30                                      | 113.00 |
| Mass Dry Soil + Container (g)      | 107.76                                                   | 106.81                  | 72.02      | 52.40                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |                                             |        |
| Mass Container (g)                 | 32.15                                                    | 30.56                   | 30.58      | 32.11                                 | Container No.                                              | 2032                                        |        |
| WATER CONTENT (%)                  | 28.28                                                    | 29.32                   | 31.32      | 29.28                                 | Mass Dry Soil + Container (g)                              | 31.08                                       |        |
| Avg. Initial Water Content, W4 (%) | 29.64                                                    | Final W <sub>at</sub> : | X          | Slice ;                               | Whole Spec.                                                | Mass Container (g)                          | 30.70  |
|                                    | See attached data sheet(s) for additional water contents |                         |            |                                       |                                                            | Mass Excess Dry Soil, M <sub>d,es</sub> (g) | 0.38   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.050 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.340                                                                                                                                                                       | 0.000                                  | 12.230                                    | 13.100                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.304                                                              | 12.212 |
| 19.290                                                                                                                                                                       | 0.000                                  | 12.110                                    | 13.060                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.040 |
| 19.290                                                                                                                                                                       | 0.000                                  | 12.180                                    | 13.040                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.304                                                              | 18.222 |
| 19.320                                                                                                                                                                       | 0.000                                  | 12.270                                    | 13.010                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.280                                                                                                                                                                       | 0.000                                  | 12.270                                    | 12.990                      | Initial Height, $H_o$                                   |  | 19.304                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 18.222                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | -0.63                                                               |        |

| Estimated Initial Unit Weight                                                                         |        | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                                         | 117.68 | Container No.                                           |      |
| Dry, $\gamma_{d,o}$ (pcf) =                                                                           | 90.78  | Mass Dry Soil + Cont. (g)                               | NA   |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |        | Mass Cont. (g)                                          | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |        | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |        |                                                         |      |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottle Brownish Yellow and Pale Yellow Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge; ☒ Wire Saw & Straight Edge; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 3/27/2008 Date: 3/27/2008 Final Calc. By: DH Date: 4/17/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08



# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-7 File Name: B-2304\_UD8a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 28.28                    | 89.88                    | 91.1                         | 94.5                  | 96.0  |
| 2                | " Bottom, W2          | 29.32                    | 89.16                    | 92.9                         | 96.4                  | 97.9  |
| 3                | " Sides, W3           | 31.32                    | 87.80                    | 96.0                         | 99.9                  | 101.4 |
| 4                | " Average, W4         | 29.64                    | 88.94                    | 93.4                         | 97.0                  | 98.5  |
| 5                | " Back Calculated (1) | 31.34                    | 87.79 (3)                | 96.0                         | 99.9                  | 101.4 |
| 6                | Final                 | 29.28                    | 87.79 (2)                | 96.0                         | 99.9                  | 101.4 |

|                                                                 |                                                                                                                                              |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b> |                                                                                                                                              |
| Used Cal. Routine No.                                           | 5 to obtain the mass of dry soil and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |
| Back Cal. $G_s$ =                                               | 2.708                                                                                                                                        |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ =               | 2.709                                                                                                                                        |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11667 |
| Final Selected, $K_f$                                                           | 0.11667 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) =                                                                              |  | 87.75                        |
| Avg. Back Calculated and Measured Mass Dry Soil (g) =                                                       |  | 87.77                        |

| Summary of Specimen Physical Properties    |                            |                  |                                   |                                               |                                                                                          |                                                   |  |                                                                              |                         |
|--------------------------------------------|----------------------------|------------------|-----------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------|--|------------------------------------------------------------------------------|-------------------------|
| Specific Gravity<br>G <sub>s</sub> = 2.710 |                            |                  | Assumed                           |                                               | To make S <sub>f</sub> = 100% at end of test.                                            |                                                   |  |                                                                              |                         |
|                                            |                            | X                | Measured                          |                                               | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                   |  |                                                                              |                         |
| Mass Dry<br>Soil, (g)                      | Initial: 87.79             | X                | From Cal. Routine No.             |                                               | 5                                                                                        | Note: Routine #5 is based on final measurements.  |  |                                                                              |                         |
|                                            | Final (4): NA              |                  | Make S <sub>f</sub> = 100%, or;   |                                               |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%     |  |                                                                              |                         |
| Initial Height (mm) =                      |                            |                  | 19.30                             | X                                             | Measured ;                                                                               |                                                   |  | Back Calculated                                                              | Back-cal. Sat. (%) = NA |
| Final Height (mm) =                        |                            |                  | 18.22                             | X                                             | Measured ;                                                                               |                                                   |  | Initial H <sub>0</sub> & dial change during loading                          |                         |
|                                            | Water<br>Content, w<br>(%) | Void Ratio,<br>e | Degree of<br>Saturation, S<br>(%) | Total Unit<br>Weight, γ <sub>t</sub><br>(pcf) | Dry Unit<br>Weight, γ <sub>d</sub><br>(pcf)                                              | Height of<br>Solids, H <sub>s</sub> (2,4)<br>(mm) |  | Extruded soil loss proportioned in<br>increasing loading increments (5)<br>: |                         |
| Initial                                    | 31.3                       | 0.885            | 96.0                              | 117.7                                         | 89.6                                                                                     | 10.243                                            |  | From                                                                         | To (ksf)                |
| Final                                      | 28.7                       | 0.779            | 99.9                              | 122.2                                         | 94.9                                                                                     | NA                                                |  | NA                                                                           | NA                      |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 61 | Minus 200 (%) |
| Casagrande Method      | 26.60             | NA                                | 0.180 | 0.083 | 3.1 | Plastic Limit (PL)    | 26 | 93.7          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 35 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP HP

Date: 4/22/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-7 File Name: B-2304\_UD8a  
 Task No.: NA Date; Start: 3/27/2008 Initial Height,  $H_o$  (mm): 19.30  
 Project Name: Exelon (Victoria) Completed: 4/17/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6844  
 Test: Initial / Pressure Gauge Back Pressure,  $U_o$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.52337,  $V$ : 0.023161541 Piston Uplift,  $P_{up}$  (lbf): 34.64  
 Back Pressure,  $U_{b, CS}$  (psi): 70.52399,  $V$ : 0.023161744 Setup  $DT_{ref}$  (V): 0.001766231  
 Displacement Transducer No.: DT-107 Calib. Factor (mm/V): 226.37841 Ch. No.: 2  
 Pore Press. Transducer No.: PT-114 Calib. Factor (psi/V): 3029.45109 Ref. Zero (V): -0.000118 Ch. No.: 3  
 Force Cell No.: FT-107 Calib. Factor (lbf/V): -155699.54 Ref. Zero (V): -0.000155 Ch. No.: 1

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP HP

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>$n$ & $n-1$ ,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| S                            | 87                    | 15 : 26 : 11         |                                                                    | 0.17                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                   |
| BS                           | 87                    | 16 : 01 : 12         |                                                                    | 2.22                                                        |                                                            | 0.040                                                         | 0.000                                                                 | 0.040                                                                   |                                                                                   |
| BE                           | 88                    | 11 : 59 : 15         |                                                                    | 5.71                                                        | 0.000                                                      | -0.006                                                        | 0.000                                                                 | -0.006                                                                  |                                                                                   |
| CS                           | 88                    | 11 : 59 : 18         | 0                                                                  | 5.71                                                        | 0.000                                                      | -0.006                                                        | 0.000                                                                 | -0.006                                                                  |                                                                                   |
|                              | 88                    | 13 : 42 : 13         | 103                                                                | 10.21                                                       | 2.044                                                      | 0.068                                                         | 0.000                                                                 | 0.068                                                                   | 0.225                                                                             |
|                              | 88                    | 17 : 06 : 55         | 308                                                                | 13.50                                                       | 4.015                                                      | 0.156                                                         | 0.000                                                                 | 0.156                                                                   | 0.133                                                                             |
|                              | 88                    | 21 : 26 : 57         | 568                                                                | 17.18                                                       | 5.715                                                      | 0.261                                                         | 0.000                                                                 | 0.261                                                                   | 0.125                                                                             |
| US                           | 89                    | 01 : 46 : 59         | 828                                                                | 21.05                                                       | 7.218                                                      | 0.368                                                         | 0.000                                                                 | 0.368                                                                   | 0.128                                                                             |
|                              | 89                    | 06 : 07 : 00         | 1088                                                               | 24.68                                                       | 8.257                                                      | 0.469                                                         | 0.000                                                                 | 0.469                                                                   | 0.122                                                                             |
|                              | 89                    | 10 : 27 : 01         | 1348                                                               | 28.15                                                       | 9.034                                                      | 0.572                                                         | 0.000                                                                 | 0.572                                                                   | 0.122                                                                             |
|                              | 89                    | 14 : 47 : 03         | 1608                                                               | 32.05                                                       | 9.965                                                      | 0.671                                                         | 0.000                                                                 | 0.671                                                                   | 0.119                                                                             |
|                              | 89                    | 19 : 07 : 04         | 1868                                                               | 35.96                                                       | 10.814                                                     | 0.776                                                         | 0.000                                                                 | 0.776                                                                   | 0.125                                                                             |
|                              | 89                    | 23 : 27 : 06         | 2128                                                               | 39.93                                                       | 11.677                                                     | 0.878                                                         | 0.000                                                                 | 0.878                                                                   | 0.122                                                                             |
|                              | 90                    | 03 : 47 : 07         | 2388                                                               | 44.14                                                       | 12.693                                                     | 0.979                                                         | 0.000                                                                 | 0.979                                                                   | 0.121                                                                             |
|                              | 90                    | 08 : 07 : 09         | 2648                                                               | 48.52                                                       | 13.782                                                     | 1.082                                                         | 0.000                                                                 | 1.082                                                                   | 0.123                                                                             |
|                              | 90                    | 12 : 27 : 11         | 2908                                                               | 52.88                                                       | 14.756                                                     | 1.183                                                         | 0.000                                                                 | 1.183                                                                   | 0.120                                                                             |
|                              | 90                    | 16 : 47 : 12         | 3168                                                               | 57.60                                                       | 15.933                                                     | 1.283                                                         | 0.000                                                                 | 1.283                                                                   | 0.120                                                                             |
|                              | 90                    | 21 : 07 : 13         | 3428                                                               | 62.14                                                       | 16.814                                                     | 1.383                                                         | 0.000                                                                 | 1.383                                                                   | 0.119                                                                             |
|                              | 91                    | 01 : 27 : 14         | 3688                                                               | 67.12                                                       | 17.952                                                     | 1.483                                                         | 0.000                                                                 | 1.483                                                                   | 0.119                                                                             |
|                              | 91                    | 05 : 47 : 16         | 3948                                                               | 71.98                                                       | 18.935                                                     | 1.580                                                         | 0.000                                                                 | 1.580                                                                   | 0.116                                                                             |
|                              | 91                    | 10 : 07 : 17         | 4208                                                               | 77.17                                                       | 20.108                                                     | 1.676                                                         | 0.000                                                                 | 1.676                                                                   | 0.114                                                                             |
| UE                           | 91                    | 14 : 27 : 19         | 4468                                                               | 82.36                                                       | 21.026                                                     | 1.773                                                         | 0.000                                                                 | 1.773                                                                   | 0.116                                                                             |
|                              | 91                    | 18 : 47 : 20         | 4728                                                               | 87.79                                                       | 21.929                                                     | 1.871                                                         | 0.000                                                                 | 1.871                                                                   | 0.117                                                                             |
|                              | 91                    | 23 : 07 : 21         | 4988                                                               | 92.28                                                       | 21.740                                                     | 1.957                                                         | 0.000                                                                 | 1.957                                                                   | 0.102                                                                             |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 92                    | 01 : 29 : 05         | 5130                                                               | 95.74                                                       | 22.466                                                     | 2.006                                                         | 0.000                                                                 | 2.006                                                                   | 0.108                                                                        |
|                              | 92                    | 01 : 47 : 23         | 5148                                                               | 94.45                                                       | 21.770                                                     | 2.007                                                         | 0.000                                                                 | 2.007                                                                   | 0.021                                                                        |
|                              | 92                    | 14 : 07 : 28         | 5888                                                               | 65.31                                                       | 0.772                                                      | 1.956                                                         | 0.000                                                                 | 1.956                                                                   | -0.021                                                                       |
|                              | 93                    | 02 : 27 : 33         | 6628                                                               | 51.00                                                       | -2.973                                                     | 1.865                                                         | 0.000                                                                 | 1.865                                                                   | -0.038                                                                       |
|                              | 93                    | 14 : 47 : 38         | 7368                                                               | 39.85                                                       | -4.489                                                     | 1.749                                                         | 0.000                                                                 | 1.749                                                                   | -0.049                                                                       |
| US                           | 94                    | 03 : 07 : 43         | 8108                                                               | 30.56                                                       | -5.861                                                     | 1.623                                                         | 0.000                                                                 | 1.623                                                                   | -0.053                                                                       |
|                              | 94                    | 15 : 27 : 48         | 8849                                                               | 23.63                                                       | -6.436                                                     | 1.483                                                         | 0.000                                                                 | 1.483                                                                   | -0.059                                                                       |
|                              | 95                    | 03 : 47 : 53         | 9589                                                               | 17.96                                                       | -6.776                                                     | 1.345                                                         | 0.000                                                                 | 1.345                                                                   | -0.058                                                                       |
|                              | 95                    | 16 : 07 : 57         | 10329                                                              | 13.42                                                       | -7.033                                                     | 1.200                                                         | 0.000                                                                 | 1.200                                                                   | -0.061                                                                       |
|                              | 96                    | 04 : 28 : 03         | 11069                                                              | 9.71                                                        | -7.186                                                     | 1.049                                                         | 0.000                                                                 | 1.049                                                                   | -0.063                                                                       |
|                              | 96                    | 16 : 48 : 08         | 11809                                                              | 6.82                                                        | -6.926                                                     | 0.894                                                         | 0.000                                                                 | 0.894                                                                   | -0.065                                                                       |
| UE                           | 97                    | 06 : 08 : 15         | 12609                                                              | 4.56                                                        | -6.693                                                     | 0.733                                                         | 0.000                                                                 | 0.733                                                                   | -0.063                                                                       |
|                              | 97                    | 11 : 48 : 17         | 12949                                                              | 12.09                                                       | -4.861                                                     | 0.818                                                         | 0.000                                                                 | 0.818                                                                   | 0.078                                                                        |
|                              | 97                    | 16 : 48 : 19         | 13249                                                              | 18.20                                                       | -1.863                                                     | 0.924                                                         | 0.000                                                                 | 0.924                                                                   | 0.110                                                                        |
|                              | 97                    | 21 : 48 : 21         | 13549                                                              | 24.84                                                       | 3.392                                                      | 1.022                                                         | 0.000                                                                 | 1.022                                                                   | 0.101                                                                        |
| US                           | 98                    | 02 : 48 : 23         | 13849                                                              | 31.67                                                       | 8.371                                                      | 1.129                                                         | 0.000                                                                 | 1.129                                                                   | 0.112                                                                        |
|                              | 98                    | 07 : 48 : 25         | 14149                                                              | 38.26                                                       | 11.948                                                     | 1.235                                                         | 0.000                                                                 | 1.235                                                                   | 0.109                                                                        |
|                              | 98                    | 12 : 48 : 27         | 14449                                                              | 44.83                                                       | 14.729                                                     | 1.345                                                         | 0.000                                                                 | 1.345                                                                   | 0.114                                                                        |
|                              | 98                    | 17 : 48 : 29         | 14749                                                              | 51.30                                                       | 16.597                                                     | 1.455                                                         | 0.000                                                                 | 1.455                                                                   | 0.114                                                                        |
|                              | 98                    | 22 : 48 : 32         | 15049                                                              | 58.27                                                       | 18.191                                                     | 1.561                                                         | 0.000                                                                 | 1.561                                                                   | 0.110                                                                        |
|                              | 99                    | 03 : 48 : 34         | 15349                                                              | 65.13                                                       | 19.413                                                     | 1.669                                                         | 0.000                                                                 | 1.669                                                                   | 0.111                                                                        |
|                              | 99                    | 08 : 48 : 35         | 15649                                                              | 72.59                                                       | 20.772                                                     | 1.773                                                         | 0.000                                                                 | 1.773                                                                   | 0.108                                                                        |
|                              | 99                    | 13 : 48 : 37         | 15949                                                              | 80.28                                                       | 21.819                                                     | 1.877                                                         | 0.000                                                                 | 1.877                                                                   | 0.108                                                                        |
|                              | 99                    | 18 : 48 : 39         | 16249                                                              | 88.11                                                       | 22.661                                                     | 1.980                                                         | 0.000                                                                 | 1.980                                                                   | 0.107                                                                        |
|                              | 99                    | 23 : 48 : 40         | 16549                                                              | 96.54                                                       | 23.819                                                     | 2.079                                                         | 0.000                                                                 | 2.079                                                                   | 0.102                                                                        |
|                              | 100                   | 04 : 48 : 42         | 16849                                                              | 104.73                                                      | 25.257                                                     | 2.177                                                         | 0.000                                                                 | 2.177                                                                   | 0.102                                                                        |
|                              | 100                   | 09 : 48 : 44         | 17149                                                              | 113.15                                                      | 27.430                                                     | 2.277                                                         | 0.000                                                                 | 2.277                                                                   | 0.103                                                                        |
| UE                           | 100                   | 14 : 48 : 47         | 17449                                                              | 121.01                                                      | 27.570                                                     | 2.377                                                         | 0.000                                                                 | 2.377                                                                   | 0.104                                                                        |
|                              | 100                   | 19 : 48 : 49         | 17750                                                              | 129.57                                                      | 29.196                                                     | 2.472                                                         | 0.000                                                                 | 2.472                                                                   | 0.099                                                                        |
|                              | 101                   | 00 : 48 : 50         | 18050                                                              | 138.76                                                      | 31.864                                                     | 2.566                                                         | 0.000                                                                 | 2.566                                                                   | 0.097                                                                        |
|                              | 101                   | 05 : 48 : 51         | 18350                                                              | 148.22                                                      | 33.606                                                     | 2.663                                                         | 0.000                                                                 | 2.663                                                                   | 0.101                                                                        |
|                              | 101                   | 10 : 48 : 54         | 18650                                                              | 157.08                                                      | 35.877                                                     | 2.763                                                         | 0.000                                                                 | 2.763                                                                   | 0.103                                                                        |
|                              | 101                   | 11 : 58 : 42         | 18719                                                              | 159.45                                                      | 36.327                                                     | 2.785                                                         | 0.000                                                                 | 2.785                                                                   | 0.100                                                                        |
|                              | 101                   | 12 : 08 : 54         | 18730                                                              | 158.66                                                      | 35.914                                                     | 2.788                                                         | 0.000                                                                 | 2.788                                                                   | 0.096                                                                        |
|                              | 102                   | 04 : 49 : 03         | 19730                                                              | 113.24                                                      | 2.960                                                      | 2.740                                                         | 0.000                                                                 | 2.740                                                                   | -0.015                                                                       |
|                              | 102                   | 21 : 29 : 11         | 20730                                                              | 86.74                                                       | -2.475                                                     | 2.637                                                         | 0.000                                                                 | 2.637                                                                   | -0.032                                                                       |
|                              | 103                   | 14 : 09 : 16         | 21730                                                              | 66.95                                                       | -4.889                                                     | 2.506                                                         | 0.000                                                                 | 2.506                                                                   | -0.041                                                                       |
|                              | 104                   | 06 : 49 : 21         | 22730                                                              | 51.63                                                       | -6.450                                                     | 2.347                                                         | 0.000                                                                 | 2.347                                                                   | -0.049                                                                       |
| US                           | 104                   | 23 : 29 : 28         | 23730                                                              | 40.36                                                       | -7.334                                                     | 2.184                                                         | 0.000                                                                 | 2.184                                                                   | -0.051                                                                       |
|                              | 105                   | 16 : 09 : 35         | 24730                                                              | 29.37                                                       | -7.993                                                     | 1.994                                                         | 0.000                                                                 | 1.994                                                                   | -0.059                                                                       |
|                              | 106                   | 08 : 49 : 40         | 25730                                                              | 21.62                                                       | -8.375                                                     | 1.801                                                         | 0.000                                                                 | 1.801                                                                   | -0.060                                                                       |
|                              | 107                   | 01 : 29 : 50         | 26731                                                              | 15.94                                                       | -8.557                                                     | 1.611                                                         | 0.000                                                                 | 1.611                                                                   | -0.059                                                                       |

## CALCULATED CRS LOADING DATA

FUGRO CONSULTANTS, INC.

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-7 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2304\_UD8

Task No.: NA Date, Start: 3/27/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.5 Piston Uplift,  $P_{up}$  (lbf): 34.64

Project Name: Exelon (Victoria) Completed: 4/17/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt ; in ☐ g/kg

Final Description of Specimen: Mottled Brownish Yellow and Pale Yellow Fat CLAY (CH)

Ring No.: 7 Area,  $A_r$  (cm<sup>2</sup>): 31.684 Solids Ht.,  $H_s$  (mm): 10.243 Specific Gravity,  $G_s = 2.710$  ☒ Meas. ; ☐ Assumed

**Initial:** Height  $H_o$ : 19.30 Water 31.3 Void 0.885 Deg. of 96.0 Total Unit 117.7 Dry Unit 89.6

**Final:** (mm):  $H_f$ : 18.22 Content,  $w$  (%): 28.7 Ratio,  $e$ : 0.779 Sat.,  $S$  (%): 99.9 Weight,  $\gamma_t$  (pcf): 122.2 Weight,  $\gamma_d$  (pcf): 94.9

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to errate
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP

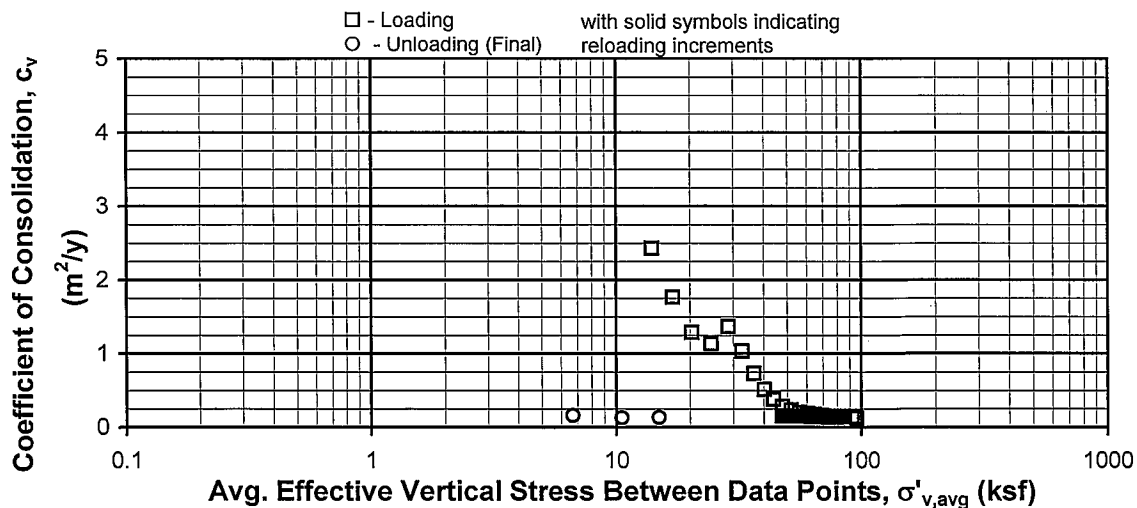
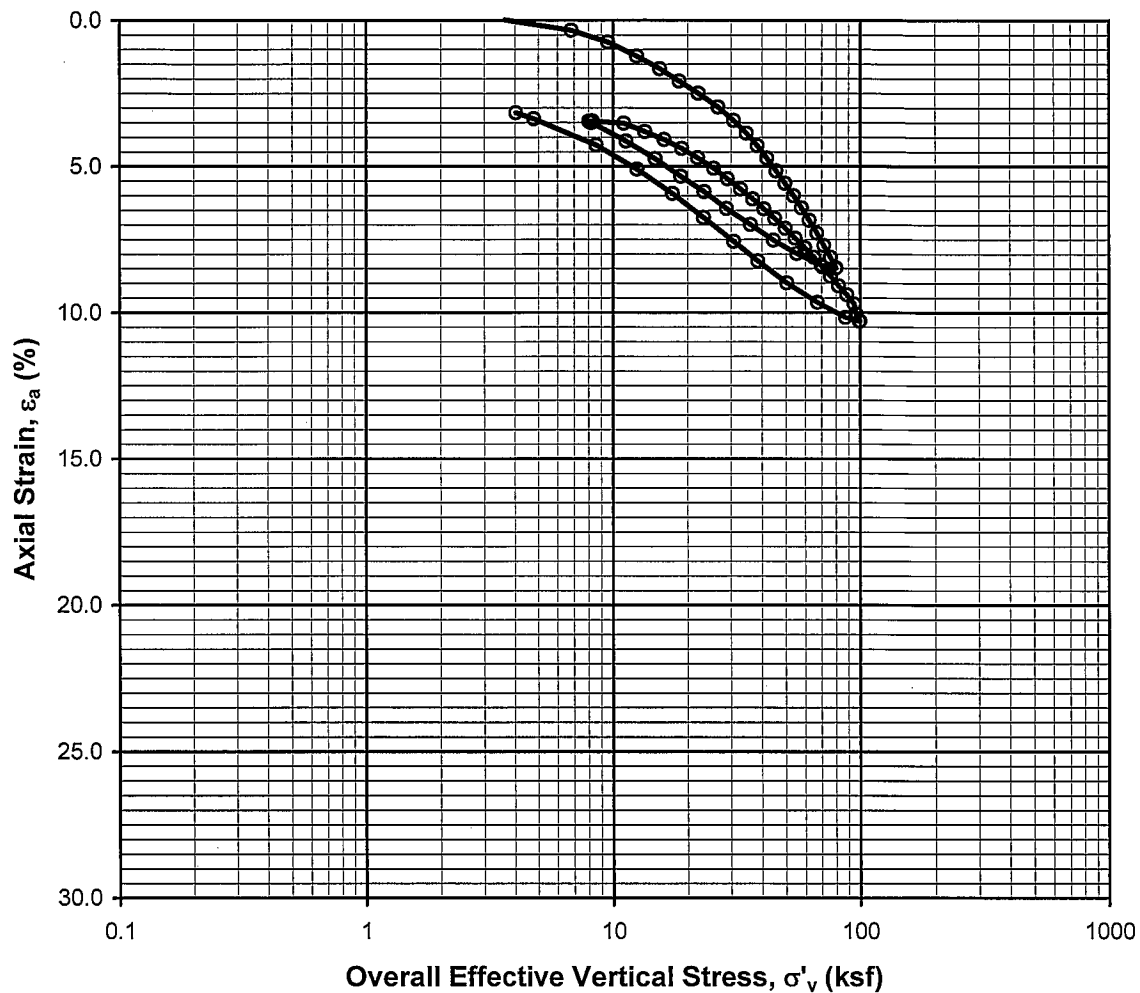
| Loading Info. (1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                             |                                                         |                               |                                          | Steady State Ratio, $SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $C_\alpha = \Delta d_{a,sc} / H_o$ ( $\times 10^{-4}$ ) |
|-------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                   |                                                        |                                                          |                                                                                                        |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf) | Coefficient of Consolidation, $C_v$ (m <sup>2</sup> /y) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                      |
| S                 |                                                        |                                                          |                                                                                                        |                           | 0.17                                        |                                                    |                                                                          |                                           | Data on given line represents average conditions           |                                                         |                               |                                          |                                                                                       |                                                                                      |
| BS                |                                                        |                                                          | 0.21                                                                                                   | 0.881                     | 2.22                                        |                                                    |                                                                          | 19.264                                    | between that line and the previous line of data.           |                                                         |                               |                                          |                                                                                       |                                                                                      |
| BE                |                                                        | 5.71                                                     | -0.03                                                                                                  | 0.885                     | 5.71                                        | 0.000                                              | 0.0                                                                      | 19.310                                    |                                                            |                                                         | 0.883                         |                                          |                                                                                       |                                                                                      |
| CS                | 0                                                      | 5.71                                                     | -0.03                                                                                                  | 0.885                     | 5.71                                        | 0.000                                              | 0.0                                                                      | 19.310                                    |                                                            |                                                         | 0.885                         |                                          |                                                                                       |                                                                                      |
|                   | 103                                                    | 8.80                                                     | 0.35                                                                                                   | 0.878                     | 10.21                                       | 2.044                                              | 20.0                                                                     | 19.236                                    | 7.26                                                       |                                                         | 0.882                         |                                          |                                                                                       |                                                                                      |
|                   | 308                                                    | 10.66                                                    | 0.81                                                                                                   | 0.869                     | 13.50                                       | 4.015                                              | 29.7                                                                     | 19.148                                    | 9.73                                                       |                                                         | 0.874                         |                                          |                                                                                       |                                                                                      |
|                   | 568                                                    | 13.12                                                    | 1.35                                                                                                   | 0.859                     | 17.18                                       | 5.715                                              | 33.3                                                                     | 19.043                                    | 11.89                                                      |                                                         | 0.864                         |                                          |                                                                                       |                                                                                      |
| US                | 828                                                    | 15.91                                                    | 1.90                                                                                                   | 0.849                     | 21.05                                       | 7.218                                              | 34.3                                                                     | 18.936                                    | 14.51                                                      |                                                         | 0.854                         |                                          |                                                                                       |                                                                                      |
|                   | 1088                                                   | 18.81                                                    | 2.43                                                                                                   | 0.839                     | 24.68                                       | 8.257                                              | 33.5                                                                     | 18.835                                    | 17.36                                                      |                                                         | 0.844                         |                                          | 0.39                                                                                  |                                                                                      |
|                   | 1348                                                   | 21.75                                                    | 2.96                                                                                                   | 0.829                     | 28.15                                       | 9.034                                              | 32.1                                                                     | 18.732                                    | 20.28                                                      |                                                         | 0.834                         |                                          | 0.66                                                                                  |                                                                                      |
|                   | 1608                                                   | 25.00                                                    | 3.48                                                                                                   | 0.819                     | 32.05                                       | 9.965                                              | 31.1                                                                     | 18.633                                    | 23.37                                                      | 0.12                                                    | 0.824                         | 4.20E-05                                 | 1.03                                                                                  |                                                                                      |
|                   | 1868                                                   | 28.33                                                    | 4.02                                                                                                   | 0.809                     | 35.96                                       | 10.814                                             | 30.1                                                                     | 18.528                                    | 26.66                                                      | 0.11                                                    | 0.814                         | 3.97E-05                                 | 1.26                                                                                  |                                                                                      |
|                   | 2128                                                   | 31.71                                                    | 4.55                                                                                                   | 0.799                     | 39.93                                       | 11.677                                             | 29.2                                                                     | 18.426                                    | 30.02                                                      | 0.10                                                    | 0.804                         | 3.53E-05                                 | 1.49                                                                                  |                                                                                      |
|                   | 2388                                                   | 35.21                                                    | 5.07                                                                                                   | 0.789                     | 44.14                                       | 12.693                                             | 28.8                                                                     | 18.325                                    | 33.46                                                      | 0.10                                                    | 0.794                         | 3.20E-05                                 | 1.76                                                                                  |                                                                                      |
|                   | 2648                                                   | 38.83                                                    | 5.61                                                                                                   | 0.779                     | 48.52                                       | 13.782                                             | 28.4                                                                     | 18.222                                    | 37.02                                                      | 0.09                                                    | 0.784                         | 2.96E-05                                 | 1.97                                                                                  |                                                                                      |
|                   | 2908                                                   | 42.52                                                    | 6.13                                                                                                   | 0.769                     | 52.88                                       | 14.756                                             | 27.9                                                                     | 18.121                                    | 40.67                                                      | 0.09                                                    | 0.774                         | 2.64E-05                                 | 2.08                                                                                  |                                                                                      |
|                   | 3168                                                   | 46.42                                                    | 6.65                                                                                                   | 0.759                     | 57.60                                       | 15.933                                             | 27.7                                                                     | 18.021                                    | 44.47                                                      | 0.09                                                    | 0.764                         | 2.42E-05                                 | 2.37                                                                                  |                                                                                      |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n} (\epsilon_{ac,n})$<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n (2)$<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                             | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                   |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k @ 20^\circ C$<br>( $m/y$ ) |                                                                                                |                                                                                                  |
|                              | 3428                                                                     | 50.35                                                                   | 7.16                                                                                                              | 0.750                              | 62.14                                                   | 16.814                                                         | 27.1                                                                                    | 17.921                                                | 48.39                                                                     | 0.08                                                        | 0.755                                  | 2.23E-05                                                    | 2.37                                                                                           |                                                                                                  |
|                              | 3688                                                                     | 54.54                                                                   | 7.68                                                                                                              | 0.740                              | 67.12                                                   | 17.952                                                         | 26.7                                                                                    | 17.821                                                | 52.45                                                                     | 0.08                                                        | 0.745                                  | 2.08E-05                                                    | 2.71                                                                                           |                                                                                                  |
|                              | 3948                                                                     | 58.73                                                                   | 8.19                                                                                                              | 0.730                              | 71.98                                                   | 18.935                                                         | 26.3                                                                                    | 17.724                                                | 56.64                                                                     | 0.07                                                        | 0.735                                  | 1.88E-05                                                    | 2.72                                                                                           |                                                                                                  |
|                              | 4208                                                                     | 63.10                                                                   | 8.68                                                                                                              | 0.721                              | 77.17                                                   | 20.108                                                         | 26.1                                                                                    | 17.628                                                | 60.91                                                                     | 0.07                                                        | 0.726                                  | 1.72E-05                                                    | 2.98                                                                                           |                                                                                                  |
| UE                           | 4468                                                                     | 67.66                                                                   | 9.19                                                                                                              | 0.712                              | 82.36                                                   | 21.026                                                         | 25.5                                                                                    | 17.531                                                | 65.38                                                                     | 0.07                                                        | 0.716                                  | 1.65E-05                                                    | 3.06                                                                                           |                                                                                                  |
|                              | 4728                                                                     | 72.48                                                                   | 9.69                                                                                                              | 0.702                              | 87.79                                                   | 21.929                                                         | 25.0                                                                                    | 17.433                                                | 70.07                                                                     |                                                             | 0.707                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 4988                                                                     | 77.14                                                                   | 10.14                                                                                                             | 0.694                              | 92.28                                                   | 21.740                                                         | 23.6                                                                                    | 17.347                                                | 74.81                                                                     |                                                             | 0.698                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 5130                                                                     | 80.10                                                                   | 10.39                                                                                                             | 0.689                              | 95.74                                                   | 22.466                                                         | 23.5                                                                                    | 17.298                                                | 78.62                                                                     |                                                             | 0.691                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 5148                                                                     | 79.31                                                                   | 10.40                                                                                                             | 0.689                              | 94.45                                                   | 21.770                                                         | 23.0                                                                                    | 17.297                                                | 79.71                                                                     |                                                             | 0.689                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 5888                                                                     | 64.79                                                                   | 10.13                                                                                                             | 0.694                              | 65.31                                                   | 0.772                                                          | 1.2                                                                                     | 17.348                                                | 72.05                                                                     |                                                             | 0.691                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 6628                                                                     | 52.97                                                                   | 9.66                                                                                                              | 0.703                              | 51.00                                                   | -2.973                                                         | -5.8                                                                                    | 17.439                                                | 58.88                                                                     |                                                             | 0.698                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 7368                                                                     | 42.79                                                                   | 9.06                                                                                                              | 0.714                              | 39.85                                                   | -4.489                                                         | -11.3                                                                                   | 17.555                                                | 47.88                                                                     |                                                             | 0.708                                  |                                                             |                                                                                                |                                                                                                  |
| US                           | 8108                                                                     | 34.36                                                                   | 8.41                                                                                                              | 0.726                              | 30.56                                                   | -5.861                                                         | -19.2                                                                                   | 17.681                                                | 38.57                                                                     |                                                             | 0.720                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 8849                                                                     | 27.75                                                                   | 7.68                                                                                                              | 0.740                              | 23.63                                                   | -6.436                                                         | -27.2                                                                                   | 17.821                                                | 31.05                                                                     | 0.14                                                        | 0.733                                  | 2.60E-05                                                    | 1.26                                                                                           |                                                                                                  |
|                              | 9589                                                                     | 22.23                                                                   | 6.97                                                                                                              | 0.753                              | 17.96                                                   | -6.776                                                         | -37.7                                                                                   | 17.959                                                | 24.99                                                                     | 0.11                                                        | 0.747                                  | 2.41E-05                                                    | 1.99                                                                                           |                                                                                                  |
|                              | 10329                                                                    | 17.77                                                                   | 6.21                                                                                                              | 0.768                              | 13.42                                                   | -7.033                                                         | -52.4                                                                                   | 18.104                                                | 20.00                                                                     | 0.09                                                        | 0.760                                  | 2.43E-05                                                    | 2.40                                                                                           |                                                                                                  |
|                              | 11069                                                                    | 14.05                                                                   | 5.43                                                                                                              | 0.782                              | 9.71                                                    | -7.186                                                         | -74.0                                                                                   | 18.255                                                | 15.91                                                                     | 0.08                                                        | 0.775                                  | 2.46E-05                                                    | 2.70                                                                                           |                                                                                                  |
|                              | 11809                                                                    | 10.88                                                                   | 4.63                                                                                                              | 0.797                              | 6.82                                                    | -6.926                                                         | -101.6                                                                                  | 18.410                                                | 12.46                                                                     | 0.07                                                        | 0.790                                  | 2.54E-05                                                    | 2.87                                                                                           |                                                                                                  |
| UE                           | 12609                                                                    | 8.32                                                                    | 3.80                                                                                                              | 0.813                              | 4.56                                                    | -6.693                                                         | -146.9                                                                                  | 18.571                                                | 9.60                                                                      | 0.06                                                        | 0.805                                  | 2.53E-05                                                    | 2.88                                                                                           |                                                                                                  |
|                              | 12949                                                                    | 15.15                                                                   | 4.24                                                                                                              | 0.805                              | 12.09                                                   | -4.861                                                         | -40.2                                                                                   | 18.486                                                | 11.74                                                                     |                                                             | 0.809                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 13249                                                                    | 19.42                                                                   | 4.79                                                                                                              | 0.794                              | 18.20                                                   | -1.863                                                         | -10.2                                                                                   | 18.380                                                | 17.28                                                                     |                                                             | 0.800                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 13549                                                                    | 22.52                                                                   | 5.29                                                                                                              | 0.785                              | 24.84                                                   | 3.392                                                          | 13.7                                                                                    | 18.282                                                | 20.97                                                                     |                                                             | 0.790                                  |                                                             |                                                                                                |                                                                                                  |
| US                           | 13849                                                                    | 25.81                                                                   | 5.85                                                                                                              | 0.774                              | 31.67                                                   | 8.371                                                          | 26.4                                                                                    | 18.175                                                | 24.16                                                                     |                                                             | 0.780                                  |                                                             |                                                                                                |                                                                                                  |
|                              | 14149                                                                    | 29.81                                                                   | 6.40                                                                                                              | 0.764                              | 38.26                                                   | 11.948                                                         | 31.2                                                                                    | 18.069                                                | 27.81                                                                     |                                                             | 0.769                                  |                                                             | 0.55                                                                                           |                                                                                                  |
|                              | 14449                                                                    | 34.38                                                                   | 6.97                                                                                                              | 0.753                              | 44.83                                                   | 14.729                                                         | 32.9                                                                                    | 17.959                                                | 32.09                                                                     |                                                             | 0.759                                  |                                                             | 0.82                                                                                           |                                                                                                  |
|                              | 14749                                                                    | 39.53                                                                   | 7.54                                                                                                              | 0.743                              | 51.30                                                   | 16.597                                                         | 32.4                                                                                    | 17.849                                                | 36.95                                                                     | 0.10                                                        | 0.748                                  | 2.25E-05                                                    | 1.02                                                                                           |                                                                                                  |
|                              | 15049                                                                    | 45.40                                                                   | 8.09                                                                                                              | 0.732                              | 58.27                                                   | 18.191                                                         | 31.2                                                                                    | 17.743                                                | 42.47                                                                     | 0.09                                                        | 0.737                                  | 1.92E-05                                                    | 1.33                                                                                           |                                                                                                  |
|                              | 15349                                                                    | 51.44                                                                   | 8.64                                                                                                              | 0.722                              | 65.13                                                   | 19.413                                                         | 29.8                                                                                    | 17.635                                                | 48.42                                                                     | 0.08                                                        | 0.727                                  | 1.77E-05                                                    | 1.53                                                                                           |                                                                                                  |
|                              | 15649                                                                    | 57.98                                                                   | 9.18                                                                                                              | 0.712                              | 72.59                                                   | 20.772                                                         | 28.6                                                                                    | 17.531                                                | 54.71                                                                     | 0.09                                                        | 0.717                                  | 1.58E-05                                                    | 1.89                                                                                           |                                                                                                  |
|                              | 15949                                                                    | 64.98                                                                   | 9.72                                                                                                              | 0.701                              | 80.28                                                   | 21.819                                                         | 27.2                                                                                    | 17.427                                                | 61.48                                                                     | 0.08                                                        | 0.706                                  | 1.47E-05                                                    | 2.16                                                                                           |                                                                                                  |

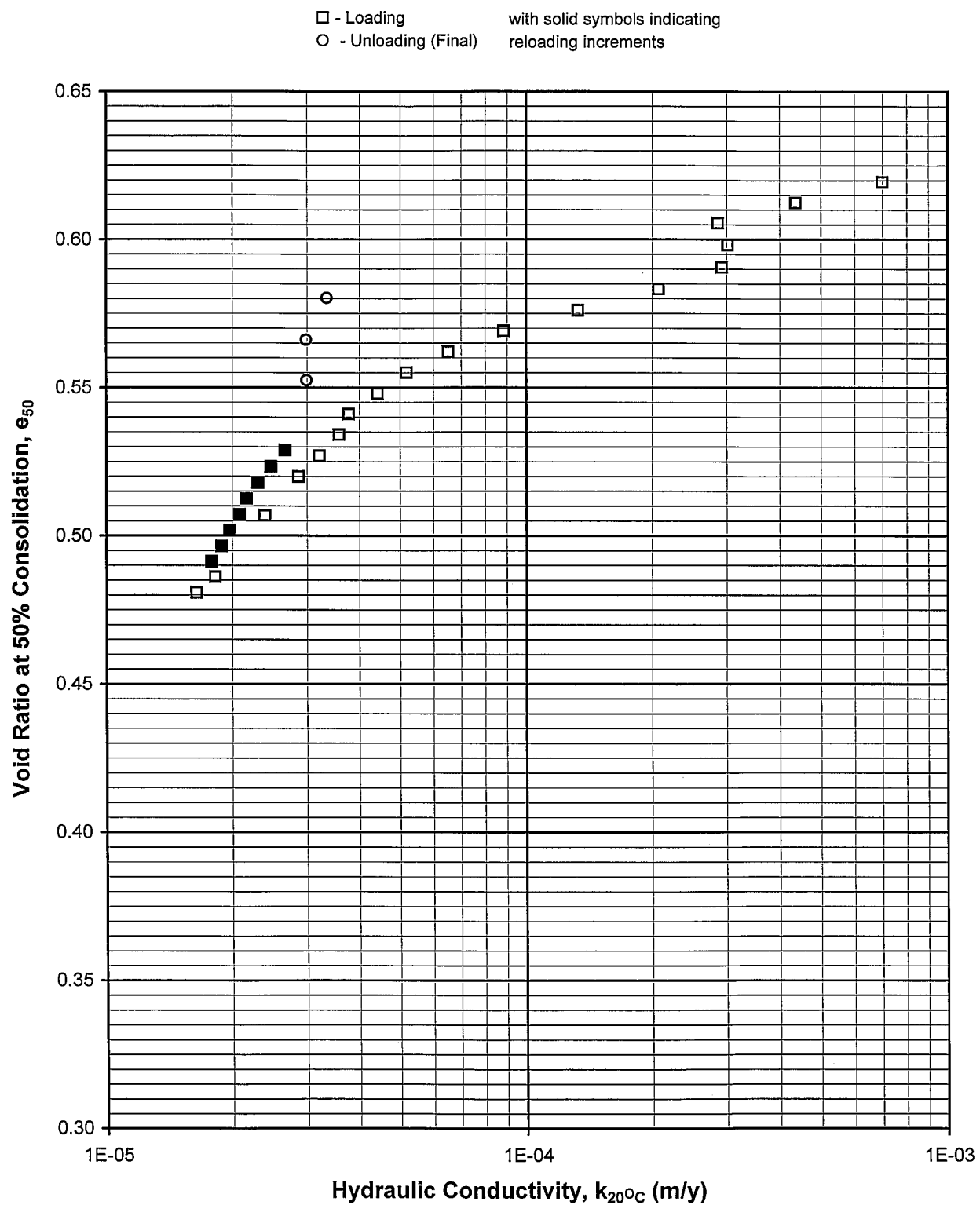
## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-11A - Depth 111.0 - 113.0 ft  
 Boring B-2304UD





**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-11A - Depth 111.0 - 113.0 ft  
Boring B-2304UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-11 File Name: B-2304\_UD11a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas. ; ☐ Assumed Ring No.: 10  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.644  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                           |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2304UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-11                                  | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 111.0 - 113.0                          | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) =           | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                             | % Comp. = $\pm$ Opt. =  |

| Water<br>Content (W);                          |                                                          | Initial - Trimming Location |                                                                     |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|------------------------------------------------|----------------------------------------------------------|-----------------------------|---------------------------------------------------------------------|------------|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                                |                                                          | Top (W1)                    | Bottom (W2)                                                         | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 338.09  | 337.95 |
| Container No.                                  |                                                          | S6                          | 836                                                                 | 2012       | 829                                   | Mass Ring (g)                                              | 215.51  |        |
| Mass Moist Soil + Container (g)                |                                                          | 114.74                      | 122.27                                                              | 104.11     | 65.84                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 122.58  | 122.44 |
| Mass Dry Soil + Container (g)                  |                                                          | 100.31                      | 106.23                                                              | 90.54      | 59.75                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                             |                                                          | 30.33                       | 32.32                                                               | 30.56      | 32.30                                 | Container No.                                              |         | 2014   |
| WATER CONTENT (%)                              |                                                          | 20.62                       | 21.70                                                               | 22.62      | 22.19                                 | Mass Dry Soil + Container (g)                              |         | 30.36  |
| Avg. Initial Water Content, W <sub>4</sub> (%) |                                                          | 21.65                       | Final W <sub>at</sub> : <input checked="" type="checkbox"/> Slice ; |            | Whole Spec.                           | Mass Container (g)                                         |         | 30.24  |
|                                                | See attached data sheet(s) for additional water contents |                             |                                                                     |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 0.12   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.050 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.190                                                                                                                                                                       | 0.000                                  | 12.980                                    | 13.280                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.186                                                              | 12.948 |
| 19.210                                                                                                                                                                       | 0.000                                  | 12.880                                    | 13.200                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.238 |
| 19.180                                                                                                                                                                       | 0.000                                  | 12.940                                    | 13.220                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.186                                                              | 18.760 |
| 19.170                                                                                                                                                                       | 0.000                                  | 13.020                                    | 13.260                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.180                                                                                                                                                                       | 0.000                                  | 12.920                                    | 13.230                      | Initial Height, $H_0$                                   |  | 19.186                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_0 - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 18.760                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_0$   |  | -0.94                                                               |        |

| Estimated Initial Unit Weight                                          |  |                                           |                             |
|------------------------------------------------------------------------|--|-------------------------------------------|-----------------------------|
| Total, $\gamma_{t,o}$ (pcf)= 126.04                                    |  | Dry, $\gamma_{d,o}$ (pcf)= 103.61         |                             |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; |  | <input type="checkbox"/> Other            |                             |
| Incremental Test: Top & Bottom:                                        |  | <input type="checkbox"/> Yes ;            | <input type="checkbox"/> No |
| CRS Test: Top Only:                                                    |  | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No |

| Soil Extruded During Loading                            |      |
|---------------------------------------------------------|------|
| Container No.                                           |      |
| Mass Dry Soil + Cont. (g)                               | NA   |
| Mass Cont. (g)                                          | NA   |
| Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/27/2008 Date: 3/27/2008 Final Calc. By: LF Date: 4/5/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-11 File Name: B-2304\_UD11a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 20.62                    | 101.62                   | 90.2                         | 95.1                  | 97.6  |
| 2                | " Bottom, W2          | 21.70                    | 100.72                   | 92.7                         | 97.7                  | 100.3 |
| 3                | " Sides, W3           | 22.62                    | 99.96                    | 94.8                         | 99.9                  | 102.5 |
| 4                | " Average, W4         | 21.65                    | 100.77                   | 92.6                         | 97.6                  | 100.1 |
| 5                | " Back Calculated (1) | 22.18                    | 100.33 (3)               | 93.8                         | 98.8                  | 101.4 |
| 6                | Final                 | 22.19                    | 100.33 (2)               | 93.8                         | 98.8                  | 101.4 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. 5                                                                                     | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = 2.701                                                                                     |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.710                                                     |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11639 |
| Final Selected, $K_f$                                                           | 0.11639 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 99.92                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 100.12                                                |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                                  |                                                                        |                      |    |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|----------------------|----|
| Specific Gravity<br>G <sub>s</sub> = 2.720 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                                  |                                                                        |                      |    |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                  |                                                                        |                      |    |
| Mass Dry Soil, (g)                         | Initial:             | 100.33        | X                           | From Cal. Routine No.                   | 5                                                                                        | Note: Routine #5 is based on final measurements. |                                                                        |                      |    |
|                                            | Final (4):           | NA            |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%    |                                                                        |                      |    |
| Initial Height (mm) =                      |                      |               | 19.19                       | X                                       | Measured ;                                                                               |                                                  | Back Calculated                                                        | Back-cal. Sat. (%) = | NA |
| Final Height (mm) =                        |                      |               | 18.76                       | X                                       | Measured ;                                                                               |                                                  | Initial H <sub>o</sub> & dial change during loading                    |                      |    |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm)      | Extruded soil loss proportioned in increasing loading increments (5) : |                      |    |
| Initial                                    | 22.2                 | 0.643         | 93.8                        | 126.0                                   | 103.2                                                                                    | 11.677                                           | From                                                                   | To (ksf)             |    |
| Final                                      | 22.0                 | 0.607         | 98.8                        | 128.8                                   | 105.5                                                                                    | NA                                               | NA                                                                     | NA                   |    |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 77 | Minus 200 (%) |
| Casagrande Method      | 33.30             | NA                                | 0.150 | 0.068 | 3.3 | Plastic Limit (PL)    | 19 | 99.1          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 58 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP HP  
 Date: 3/7/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-11 File Name: B-2304\_UD11a  
 Task No.: NA Date; Start: 3/27/2008 Initial Height,  $H_o$  (mm): 19.19  
 Project Name: Exelon (Victoria) Completed: 4/5/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6439  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.21998,  $V$ : 0.023022376 Piston Uplift,  $P_{up}$  (lbf): 34.48  
 Back Pressure,  $U_{b, CS}$  (psi): 70.20113,  $V$ : 0.023016166 Setup  $DT_{ref}$  (V): 0.003953888  
 Displacement Transducer No.: DT-099 Calib. Factor (mm/V): 387.222306 Ch. No.: 2  
 Pore Press. Transducer No.: PT-122 Calib. Factor (psi/V): 3035.3833 Ref. Zero (V): -0.000111 Ch. No.: 3  
 Force Cell No.: FT-410 Calib. Factor (lbf/V): -160210.65 Ref. Zero (V): -0.000058 Ch. No.: 1

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 87                    | 15 : 18 : 27         |                                                                    | 0.16                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 87                    | 15 : 40 : 02         |                                                                    | 1.54                                                        |                                                            | 0.039                                                         | 0.000                                                                 | 0.039                                                                   |                                                                              |
| BE                           | 88                    | 12 : 12 : 16         |                                                                    | 3.63                                                        | 0.003                                                      | -0.004                                                        | 0.000                                                                 | -0.004                                                                  |                                                                              |
| CS                           | 88                    | 12 : 12 : 19         | 0                                                                  | 3.63                                                        | 0.000                                                      | -0.004                                                        | 0.000                                                                 | -0.004                                                                  |                                                                              |
|                              | 88                    | 13 : 31 : 59         | 80                                                                 | 7.28                                                        | 0.685                                                      | 0.064                                                         | 0.000                                                                 | 0.064                                                                   | 0.271                                                                        |
|                              | 88                    | 15 : 22 : 00         | 190                                                                | 10.22                                                       | 0.990                                                      | 0.142                                                         | 0.000                                                                 | 0.142                                                                   | 0.221                                                                        |
| US                           | 88                    | 17 : 12 : 01         | 300                                                                | 13.11                                                       | 0.904                                                      | 0.235                                                         | 0.000                                                                 | 0.235                                                                   | 0.263                                                                        |
|                              | 88                    | 19 : 02 : 02         | 410                                                                | 16.29                                                       | 1.262                                                      | 0.317                                                         | 0.000                                                                 | 0.317                                                                   | 0.234                                                                        |
|                              | 88                    | 20 : 52 : 03         | 520                                                                | 19.98                                                       | 2.124                                                      | 0.398                                                         | 0.000                                                                 | 0.398                                                                   | 0.229                                                                        |
|                              | 88                    | 22 : 42 : 04         | 630                                                                | 24.22                                                       | 3.092                                                      | 0.479                                                         | 0.000                                                                 | 0.479                                                                   | 0.232                                                                        |
|                              | 89                    | 00 : 32 : 05         | 740                                                                | 28.09                                                       | 2.302                                                      | 0.569                                                         | 0.000                                                                 | 0.569                                                                   | 0.256                                                                        |
|                              | 89                    | 02 : 22 : 07         | 850                                                                | 32.65                                                       | 2.968                                                      | 0.656                                                         | 0.000                                                                 | 0.656                                                                   | 0.245                                                                        |
|                              | 89                    | 04 : 12 : 08         | 960                                                                | 37.51                                                       | 4.320                                                      | 0.741                                                         | 0.000                                                                 | 0.741                                                                   | 0.242                                                                        |
|                              | 89                    | 06 : 02 : 10         | 1070                                                               | 42.79                                                       | 6.614                                                      | 0.823                                                         | 0.000                                                                 | 0.823                                                                   | 0.233                                                                        |
|                              | 89                    | 07 : 52 : 12         | 1180                                                               | 48.52                                                       | 9.654                                                      | 0.905                                                         | 0.000                                                                 | 0.905                                                                   | 0.232                                                                        |
|                              | 89                    | 09 : 42 : 13         | 1290                                                               | 54.52                                                       | 12.761                                                     | 0.987                                                         | 0.000                                                                 | 0.987                                                                   | 0.235                                                                        |
|                              | 89                    | 11 : 32 : 15         | 1400                                                               | 60.28                                                       | 15.263                                                     | 1.069                                                         | 0.000                                                                 | 1.069                                                                   | 0.234                                                                        |
|                              | 89                    | 13 : 22 : 16         | 1510                                                               | 65.90                                                       | 17.363                                                     | 1.151                                                         | 0.000                                                                 | 1.151                                                                   | 0.233                                                                        |
|                              | 89                    | 15 : 12 : 17         | 1620                                                               | 71.37                                                       | 19.192                                                     | 1.230                                                         | 0.000                                                                 | 1.230                                                                   | 0.225                                                                        |
|                              | 89                    | 17 : 02 : 18         | 1730                                                               | 77.09                                                       | 21.065                                                     | 1.314                                                         | 0.000                                                                 | 1.314                                                                   | 0.237                                                                        |
|                              | 89                    | 18 : 52 : 20         | 1840                                                               | 83.07                                                       | 23.161                                                     | 1.396                                                         | 0.000                                                                 | 1.396                                                                   | 0.235                                                                        |
|                              | 89                    | 20 : 42 : 21         | 1950                                                               | 89.14                                                       | 25.227                                                     | 1.478                                                         | 0.000                                                                 | 1.478                                                                   | 0.232                                                                        |
| US                           | 89                    | 22 : 32 : 23         | 2060                                                               | 95.22                                                       | 27.264                                                     | 1.557                                                         | 0.000                                                                 | 1.557                                                                   | 0.224                                                                        |
|                              | 90                    | 00 : 05 : 53         | 2154                                                               | 100.48                                                      | 29.048                                                     | 1.625                                                         | 0.000                                                                 | 1.625                                                                   | 0.228                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 90                    | 00 : 12 : 23         | 2160                                                               | 99.10                                                       | 27.647                                                     | 1.627                                                         | 0.000                                                                 | 1.627                                                                   | 0.121                                                                        |
|                              | 90                    | 05 : 12 : 27         | 2460                                                               | 67.52                                                       | -2.981                                                     | 1.607                                                         | 0.000                                                                 | 1.607                                                                   | -0.021                                                                       |
|                              | 90                    | 10 : 12 : 31         | 2760                                                               | 50.27                                                       | -7.950                                                     | 1.530                                                         | 0.000                                                                 | 1.530                                                                   | -0.079                                                                       |
|                              | 90                    | 15 : 12 : 35         | 3060                                                               | 38.16                                                       | -10.033                                                    | 1.443                                                         | 0.000                                                                 | 1.443                                                                   | -0.091                                                                       |
|                              | 90                    | 20 : 12 : 39         | 3360                                                               | 29.16                                                       | -10.803                                                    | 1.341                                                         | 0.000                                                                 | 1.341                                                                   | -0.106                                                                       |
| US                           | 91                    | 01 : 12 : 42         | 3660                                                               | 21.89                                                       | -11.094                                                    | 1.235                                                         | 0.000                                                                 | 1.235                                                                   | -0.111                                                                       |
|                              | 91                    | 06 : 12 : 45         | 3960                                                               | 16.87                                                       | -10.584                                                    | 1.123                                                         | 0.000                                                                 | 1.123                                                                   | -0.116                                                                       |
|                              | 91                    | 11 : 12 : 48         | 4260                                                               | 13.08                                                       | -9.478                                                     | 1.024                                                         | 0.000                                                                 | 1.024                                                                   | -0.104                                                                       |
|                              | 91                    | 16 : 12 : 53         | 4561                                                               | 9.49                                                        | -9.039                                                     | 0.908                                                         | 0.000                                                                 | 0.908                                                                   | -0.121                                                                       |
|                              | 91                    | 21 : 12 : 55         | 4861                                                               | 6.33                                                        | -8.801                                                     | 0.793                                                         | 0.000                                                                 | 0.793                                                                   | -0.120                                                                       |
| UE                           | 92                    | 02 : 12 : 59         | 5161                                                               | 3.77                                                        | -8.360                                                     | 0.672                                                         | 0.000                                                                 | 0.672                                                                   | -0.126                                                                       |
|                              | 92                    | 02 : 33 : 38         | 5181                                                               | 3.63                                                        | -8.305                                                     | 0.662                                                         | 0.000                                                                 | 0.662                                                                   | -0.148                                                                       |
|                              | 92                    | 02 : 43 : 00         | 5191                                                               | 3.99                                                        | -7.926                                                     | 0.660                                                         | 0.000                                                                 | 0.660                                                                   | -0.064                                                                       |
|                              | 92                    | 04 : 13 : 00         | 5281                                                               | 10.41                                                       | -1.053                                                     | 0.676                                                         | 0.000                                                                 | 0.676                                                                   | 0.057                                                                        |
|                              | 92                    | 05 : 43 : 02         | 5371                                                               | 16.97                                                       | 4.959                                                      | 0.729                                                         | 0.000                                                                 | 0.729                                                                   | 0.184                                                                        |
|                              | 92                    | 07 : 13 : 03         | 5461                                                               | 22.37                                                       | 8.707                                                      | 0.783                                                         | 0.000                                                                 | 0.783                                                                   | 0.186                                                                        |
|                              | 92                    | 08 : 43 : 03         | 5551                                                               | 27.58                                                       | 11.873                                                     | 0.842                                                         | 0.000                                                                 | 0.842                                                                   | 0.204                                                                        |
| US                           | 92                    | 10 : 13 : 04         | 5641                                                               | 32.76                                                       | 14.753                                                     | 0.903                                                         | 0.000                                                                 | 0.903                                                                   | 0.213                                                                        |
|                              | 92                    | 11 : 43 : 07         | 5731                                                               | 37.88                                                       | 16.940                                                     | 0.972                                                         | 0.000                                                                 | 0.972                                                                   | 0.240                                                                        |
|                              | 92                    | 13 : 13 : 08         | 5821                                                               | 42.86                                                       | 18.980                                                     | 1.041                                                         | 0.000                                                                 | 1.041                                                                   | 0.242                                                                        |
|                              | 92                    | 14 : 43 : 11         | 5911                                                               | 48.03                                                       | 20.966                                                     | 1.107                                                         | 0.000                                                                 | 1.107                                                                   | 0.230                                                                        |
|                              | 92                    | 16 : 13 : 12         | 6001                                                               | 53.19                                                       | 22.765                                                     | 1.173                                                         | 0.000                                                                 | 1.173                                                                   | 0.228                                                                        |
|                              | 92                    | 17 : 43 : 14         | 6091                                                               | 58.41                                                       | 24.425                                                     | 1.237                                                         | 0.000                                                                 | 1.237                                                                   | 0.221                                                                        |
|                              | 92                    | 19 : 13 : 16         | 6181                                                               | 63.79                                                       | 25.907                                                     | 1.301                                                         | 0.000                                                                 | 1.301                                                                   | 0.223                                                                        |
|                              | 92                    | 20 : 43 : 17         | 6271                                                               | 69.39                                                       | 27.306                                                     | 1.366                                                         | 0.000                                                                 | 1.366                                                                   | 0.226                                                                        |
|                              | 92                    | 22 : 13 : 19         | 6361                                                               | 75.14                                                       | 28.582                                                     | 1.430                                                         | 0.000                                                                 | 1.430                                                                   | 0.222                                                                        |
|                              | 92                    | 23 : 43 : 21         | 6451                                                               | 81.11                                                       | 29.879                                                     | 1.493                                                         | 0.000                                                                 | 1.493                                                                   | 0.219                                                                        |
|                              | 93                    | 01 : 13 : 23         | 6541                                                               | 87.16                                                       | 30.984                                                     | 1.556                                                         | 0.000                                                                 | 1.556                                                                   | 0.217                                                                        |
|                              | 93                    | 02 : 43 : 24         | 6631                                                               | 93.36                                                       | 32.074                                                     | 1.619                                                         | 0.000                                                                 | 1.619                                                                   | 0.219                                                                        |
|                              | 93                    | 04 : 13 : 25         | 6721                                                               | 99.54                                                       | 33.074                                                     | 1.681                                                         | 0.000                                                                 | 1.681                                                                   | 0.216                                                                        |
|                              | 93                    | 05 : 43 : 26         | 6811                                                               | 105.79                                                      | 33.643                                                     | 1.743                                                         | 0.000                                                                 | 1.743                                                                   | 0.214                                                                        |
|                              | 93                    | 07 : 13 : 28         | 6901                                                               | 112.22                                                      | 33.643                                                     | 1.802                                                         | 0.000                                                                 | 1.802                                                                   | 0.206                                                                        |
|                              | 93                    | 08 : 43 : 31         | 6991                                                               | 118.62                                                      | 33.643                                                     | 1.863                                                         | 0.000                                                                 | 1.863                                                                   | 0.213                                                                        |
| UE                           | 93                    | 10 : 13 : 33         | 7081                                                               | 124.98                                                      | 40.565                                                     | 1.925                                                         | 0.000                                                                 | 1.925                                                                   | 0.213                                                                        |
|                              | 93                    | 11 : 34 : 21         | 7162                                                               | 130.29                                                      | 42.615                                                     | 1.973                                                         | 0.000                                                                 | 1.973                                                                   | 0.188                                                                        |
|                              | 93                    | 11 : 43 : 34         | 7171                                                               | 128.26                                                      | 40.580                                                     | 1.975                                                         | 0.000                                                                 | 1.975                                                                   | 0.061                                                                        |
|                              | 93                    | 18 : 33 : 40         | 7581                                                               | 84.54                                                       | -4.340                                                     | 1.950                                                         | 0.000                                                                 | 1.950                                                                   | -0.019                                                                       |
|                              | 94                    | 01 : 23 : 46         | 7991                                                               | 60.03                                                       | -11.289                                                    | 1.852                                                         | 0.000                                                                 | 1.852                                                                   | -0.075                                                                       |
|                              | 94                    | 08 : 13 : 51         | 8402                                                               | 43.31                                                       | -11.325                                                    | 1.724                                                         | 0.000                                                                 | 1.724                                                                   | -0.097                                                                       |
|                              | 94                    | 15 : 03 : 56         | 8812                                                               | 31.49                                                       | -11.101                                                    | 1.579                                                         | 0.000                                                                 | 1.579                                                                   | -0.111                                                                       |
|                              | 94                    | 21 : 54 : 03         | 9222                                                               | 24.00                                                       | -10.813                                                    | 1.451                                                         | 0.000                                                                 | 1.451                                                                   | -0.098                                                                       |
| US                           | 95                    | 04 : 44 : 11         | 9632                                                               | 16.55                                                       | -10.825                                                    | 1.295                                                         | 0.000                                                                 | 1.295                                                                   | -0.119                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-11 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2304\_UD1

Task No.: NA Date: Start: 3/27/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.2 Piston Uplift,  $P_{up}$  (lbf): 34.48

Project Name: Exelon (Victoria) Completed: 4/5/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt ; in g/kg

Final Description of Specimen: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Ring No.: 10 Area,  $A_r$  (cm<sup>2</sup>): 31.644 Solids Ht.,  $H_s$  (mm): 11.677 Specific Gravity,  $G_s = 2.720$  ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.19 Water 22.2 Void 0.643 Deg. of 93.8 Total Unit 126.0 Dry Unit 103.2  
**Final:** (mm):  $H_f$ : 18.76 Content,  $w$  (%): 22.0 Ratio,  $e$ : 0.607 Sat.,  $S$  (%): 98.8 Weight,  $\gamma_t$  (pcf): 128.8 Weight,  $\gamma_d$  (pcf): 105.5

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.16                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
| BS                           |                                                                          |                                                                         | 0.20                                                                                                                  | 0.640                              | 1.54                                                    |                                                                |                                                                                         | 19.147                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
| BE                           |                                                                          | 3.63                                                                    | -0.02                                                                                                                 | 0.643                              | 3.63                                                    | 0.003                                                          | 0.1                                                                                     | 19.190                                                |                                                                           |                                                                     | 0.642                                  |                                                   |                                                                                                |                                                                                                        |
| CS                           | 0                                                                        | 3.63                                                                    | -0.02                                                                                                                 | 0.643                              | 3.63                                                    | 0.000                                                          | 0.0                                                                                     | 19.190                                                |                                                                           |                                                                     | 0.643                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 80                                                                       | 6.82                                                                    | 0.34                                                                                                                  | 0.637                              | 7.28                                                    | 0.685                                                          | 9.4                                                                                     | 19.122                                                | 5.22                                                                      |                                                                     | 0.640                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 190                                                                      | 9.54                                                                    | 0.74                                                                                                                  | 0.631                              | 10.22                                                   | 0.990                                                          | 9.7                                                                                     | 19.044                                                | 8.18                                                                      |                                                                     | 0.634                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 300                                                                      | 12.50                                                                   | 1.22                                                                                                                  | 0.623                              | 13.11                                                   | 0.904                                                          | 6.9                                                                                     | 18.951                                                | 11.02                                                                     |                                                                     | 0.627                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 410                                                                      | 15.44                                                                   | 1.65                                                                                                                  | 0.616                              | 16.29                                                   | 1.262                                                          | 7.7                                                                                     | 18.869                                                | 13.97                                                                     | 2.43                                                                | 0.619                                  | 6.99E-04                                          | 2.84                                                                                           |                                                                                                        |
|                              | 520                                                                      | 18.54                                                                   | 2.07                                                                                                                  | 0.609                              | 19.98                                                   | 2.124                                                          | 10.6                                                                                    | 18.788                                                | 16.99                                                                     | 1.77                                                                | 0.612                                  | 4.35E-04                                          | 4.17                                                                                           |                                                                                                        |
|                              | 630                                                                      | 22.11                                                                   | 2.50                                                                                                                  | 0.602                              | 24.22                                                   | 3.092                                                          | 12.8                                                                                    | 18.707                                                | 20.33                                                                     | 1.29                                                                | 0.605                                  | 2.86E-04                                          | 4.59                                                                                           |                                                                                                        |
|                              | 740                                                                      | 26.53                                                                   | 2.97                                                                                                                  | 0.594                              | 28.09                                                   | 2.302                                                          | 8.2                                                                                     | 18.617                                                | 24.32                                                                     | 1.13                                                                | 0.598                                  | 3.02E-04                                          | 5.44                                                                                           |                                                                                                        |
|                              | 850                                                                      | 30.64                                                                   | 3.42                                                                                                                  | 0.587                              | 32.65                                                   | 2.968                                                          | 9.1                                                                                     | 18.530                                                | 28.59                                                                     | 1.37                                                                | 0.591                                  | 2.92E-04                                          | 8.30                                                                                           |                                                                                                        |
|                              | 960                                                                      | 34.57                                                                   | 3.86                                                                                                                  | 0.580                              | 37.51                                                   | 4.320                                                          | 11.5                                                                                    | 18.445                                                | 32.61                                                                     | 1.03                                                                | 0.583                                  | 2.07E-04                                          | 7.59                                                                                           |                                                                                                        |
|                              | 1070                                                                     | 38.26                                                                   | 4.29                                                                                                                  | 0.573                              | 42.79                                                   | 6.614                                                          | 15.5                                                                                    | 18.363                                                | 36.42                                                                     | 0.73                                                                | 0.576                                  | 1.33E-04                                          | 6.30                                                                                           |                                                                                                        |
|                              | 1180                                                                     | 41.85                                                                   | 4.71                                                                                                                  | 0.566                              | 48.52                                                   | 9.654                                                          | 19.9                                                                                    | 18.281                                                | 40.06                                                                     | 0.51                                                                | 0.569                                  | 8.85E-05                                          | 5.13                                                                                           |                                                                                                        |
|                              | 1290                                                                     | 45.64                                                                   | 5.14                                                                                                                  | 0.558                              | 54.52                                                   | 12.761                                                         | 23.4                                                                                    | 18.199                                                | 43.75                                                                     | 0.38                                                                | 0.562                                  | 6.50E-05                                          | 4.28                                                                                           |                                                                                                        |
|                              | 1400                                                                     | 49.61                                                                   | 5.57                                                                                                                  | 0.551                              | 60.28                                                   | 15.263                                                         | 25.3                                                                                    | 18.117                                                | 47.63                                                                     | 0.28                                                                | 0.555                                  | 5.17E-05                                          | 3.58                                                                                           |                                                                                                        |

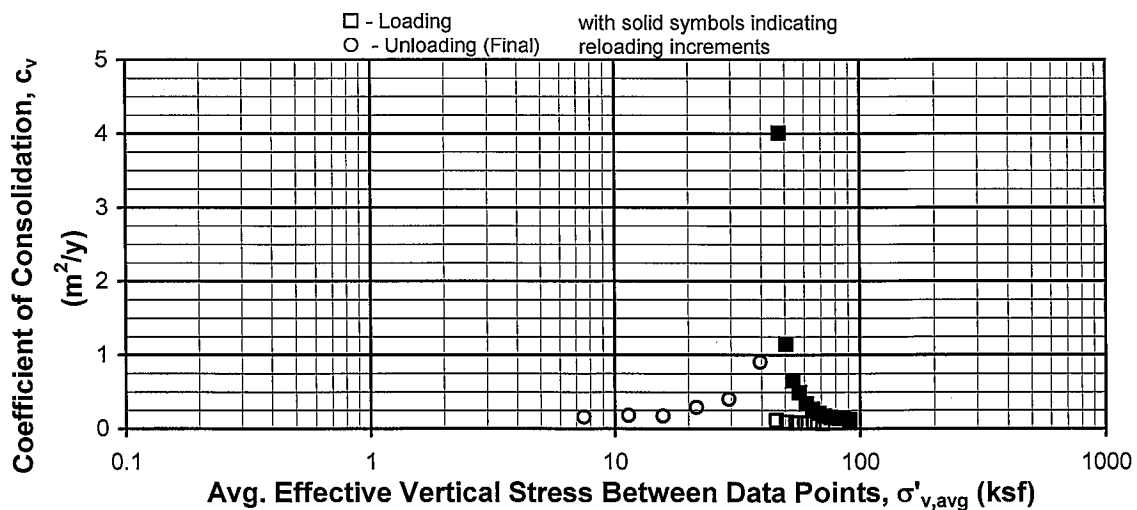
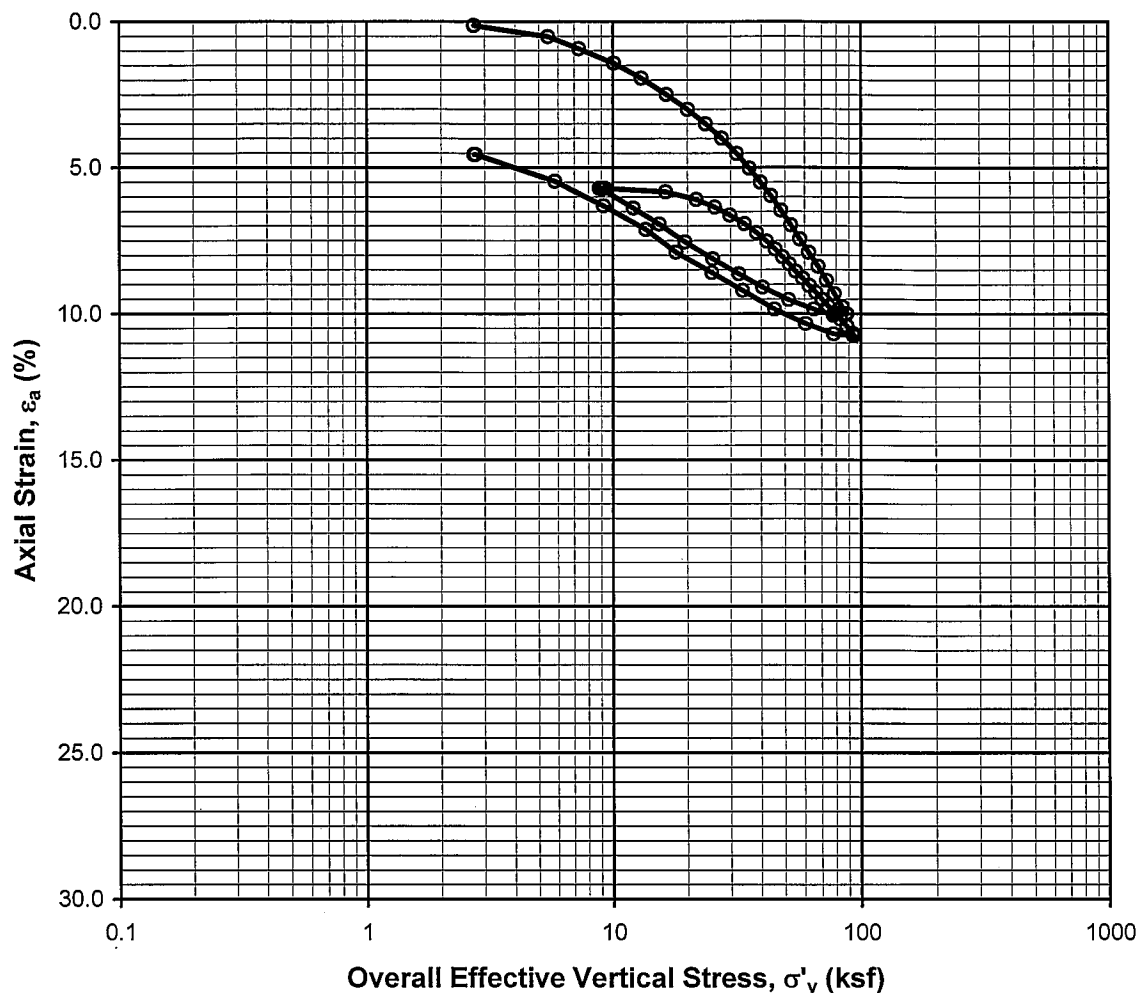
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                       | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>( $m/y$ ) |                                                                                                     |                                                                                                       |
|                              | 1510                                                                     | 53.75                                                                   | 6.00                                                                                                                  | 0.544                              | 65.90                                                   | 17.363                                                         | 26.3                                                                                    | 18.035                                                | 51.68                                                                     | 0.23                                                        | 0.548                                  | 4.41E-05                                              | 3.28                                                                                                |                                                                                                       |
|                              | 1620                                                                     | 57.92                                                                   | 6.41                                                                                                                  | 0.538                              | 71.37                                                   | 19.192                                                         | 26.9                                                                                    | 17.956                                                | 55.84                                                                     | 0.20                                                        | 0.541                                  | 3.77E-05                                              | 3.09                                                                                                |                                                                                                       |
|                              | 1730                                                                     | 62.31                                                                   | 6.85                                                                                                                  | 0.531                              | 77.09                                                   | 21.065                                                         | 27.3                                                                                    | 17.872                                                | 60.12                                                                     | 0.19                                                        | 0.534                                  | 3.57E-05                                              | 3.17                                                                                                |                                                                                                       |
|                              | 1840                                                                     | 66.80                                                                   | 7.28                                                                                                                  | 0.523                              | 83.07                                                   | 23.161                                                         | 27.9                                                                                    | 17.790                                                | 64.56                                                                     | 0.18                                                        | 0.527                                  | 3.21E-05                                              | 3.24                                                                                                |                                                                                                       |
|                              | 1950                                                                     | 71.41                                                                   | 7.70                                                                                                                  | 0.516                              | 89.14                                                   | 25.227                                                         | 28.3                                                                                    | 17.708                                                | 69.11                                                                     | 0.16                                                        | 0.520                                  | 2.86E-05                                              | 3.21                                                                                                |                                                                                                       |
| US                           | 2060                                                                     | 76.04                                                                   | 8.11                                                                                                                  | 0.510                              | 95.22                                                   | 27.264                                                         | 28.6                                                                                    | 17.629                                                | 73.73                                                                     |                                                             | 0.513                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 2154                                                                     | 80.04                                                                   | 8.47                                                                                                                  | 0.504                              | 100.48                                                  | 29.048                                                         | 28.9                                                                                    | 17.561                                                | 78.04                                                                     | 0.14                                                        | 0.507                                  | 2.39E-05                                              | 3.14                                                                                                |                                                                                                       |
|                              | 2160                                                                     | 79.69                                                                   | 8.48                                                                                                                  | 0.504                              | 99.10                                                   | 27.647                                                         | 27.9                                                                                    | 17.559                                                | 79.86                                                                     |                                                             | 0.504                                  |                                                       | -11.82                                                                                              |                                                                                                       |
|                              | 2460                                                                     | 69.50                                                                   | 8.37                                                                                                                  | 0.505                              | 67.52                                                   | -2.981                                                         | -4.4                                                                                    | 17.579                                                | 74.59                                                                     |                                                             | 0.505                                  |                                                       | -17.24                                                                                              |                                                                                                       |
|                              | 2760                                                                     | 55.44                                                                   | 7.98                                                                                                                  | 0.512                              | 50.27                                                   | -7.950                                                         | -15.8                                                                                   | 17.656                                                | 62.47                                                                     | 0.90                                                        | 0.509                                  | 3.98E-05                                              | 27.26                                                                                               |                                                                                                       |
|                              | 3060                                                                     | 44.58                                                                   | 7.52                                                                                                                  | 0.519                              | 38.16                                                   | -10.033                                                        | -26.3                                                                                   | 17.743                                                | 50.01                                                                     | 0.41                                                        | 0.516                                  | 2.77E-05                                              | 13.70                                                                                               |                                                                                                       |
|                              | 3360                                                                     | 35.98                                                                   | 6.99                                                                                                                  | 0.528                              | 29.16                                                   | -10.803                                                        | -37.0                                                                                   | 17.845                                                | 40.28                                                                     | 0.28                                                        | 0.524                                  | 2.76E-05                                              | 10.17                                                                                               |                                                                                                       |
| US                           | 3660                                                                     | 28.77                                                                   | 6.43                                                                                                                  | 0.537                              | 21.89                                                   | -11.094                                                        | -50.7                                                                                   | 17.951                                                | 32.37                                                                     |                                                             | 0.533                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 3960                                                                     | 23.34                                                                   | 5.85                                                                                                                  | 0.547                              | 16.87                                                   | -10.584                                                        | -62.7                                                                                   | 18.063                                                | 26.05                                                                     | 0.17                                                        | 0.542                                  | 2.91E-05                                              | 7.16                                                                                                |                                                                                                       |
|                              | 4260                                                                     | 18.81                                                                   | 5.33                                                                                                                  | 0.555                              | 13.08                                                   | -9.478                                                         | -72.4                                                                                   | 18.162                                                | 21.08                                                                     | 0.14                                                        | 0.551                                  | 2.82E-05                                              | 6.54                                                                                                |                                                                                                       |
|                              | 4561                                                                     | 14.82                                                                   | 4.73                                                                                                                  | 0.565                              | 9.49                                                    | -9.039                                                         | -95.3                                                                                   | 18.278                                                | 16.82                                                                     | 0.16                                                        | 0.560                                  | 3.55E-05                                              | 7.62                                                                                                |                                                                                                       |
|                              | 4861                                                                     | 11.32                                                                   | 4.13                                                                                                                  | 0.575                              | 6.33                                                    | -8.801                                                         | -139.1                                                                                  | 18.393                                                | 13.07                                                                     | 0.16                                                        | 0.570                                  | 3.66E-05                                              | 8.14                                                                                                |                                                                                                       |
| UE                           | 5161                                                                     | 8.22                                                                    | 3.50                                                                                                                  | 0.585                              | 3.77                                                    | -8.360                                                         | -221.6                                                                                  | 18.514                                                | 9.77                                                                      | 0.16                                                        | 0.580                                  | 3.96E-05                                              | 8.44                                                                                                |                                                                                                       |
|                              | 5181                                                                     | 8.03                                                                    | 3.45                                                                                                                  | 0.586                              | 3.63                                                    | -8.305                                                         | -228.5                                                                                  | 18.524                                                | 8.13                                                                      |                                                             | 0.586                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 5191                                                                     | 8.27                                                                    | 3.44                                                                                                                  | 0.586                              | 3.99                                                    | -7.926                                                         | -198.6                                                                                  | 18.526                                                | 8.15                                                                      |                                                             | 0.586                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 5281                                                                     | 11.10                                                                   | 3.53                                                                                                                  | 0.585                              | 10.41                                                   | -1.053                                                         | -10.1                                                                                   | 18.510                                                | 9.69                                                                      |                                                             | 0.586                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 5371                                                                     | 13.47                                                                   | 3.80                                                                                                                  | 0.581                              | 16.97                                                   | 4.959                                                          | 29.2                                                                                    | 18.457                                                | 12.29                                                                     |                                                             | 0.583                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 5461                                                                     | 16.10                                                                   | 4.08                                                                                                                  | 0.576                              | 22.37                                                   | 8.707                                                          | 38.9                                                                                    | 18.403                                                | 14.79                                                                     |                                                             | 0.578                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 5551                                                                     | 18.95                                                                   | 4.39                                                                                                                  | 0.571                              | 27.58                                                   | 11.873                                                         | 43.0                                                                                    | 18.344                                                | 17.53                                                                     |                                                             | 0.573                                  |                                                       |                                                                                                     |                                                                                                       |
| US                           | 5641                                                                     | 21.98                                                                   | 4.71                                                                                                                  | 0.566                              | 32.76                                                   | 14.753                                                         | 45.0                                                                                    | 18.283                                                | 20.46                                                                     |                                                             | 0.568                                  |                                                       |                                                                                                     |                                                                                                       |
|                              | 5731                                                                     | 25.51                                                                   | 5.07                                                                                                                  | 0.560                              | 37.88                                                   | 16.940                                                         | 44.7                                                                                    | 18.214                                                | 23.75                                                                     |                                                             | 0.563                                  |                                                       | 0.24                                                                                                |                                                                                                       |
|                              | 5821                                                                     | 29.02                                                                   | 5.43                                                                                                                  | 0.554                              | 42.86                                                   | 18.980                                                         | 44.3                                                                                    | 18.145                                                | 27.27                                                                     |                                                             | 0.557                                  |                                                       | 0.42                                                                                                |                                                                                                       |
|                              | 5911                                                                     | 32.77                                                                   | 5.77                                                                                                                  | 0.548                              | 48.03                                                   | 20.966                                                         | 43.6                                                                                    | 18.079                                                | 30.90                                                                     |                                                             | 0.551                                  |                                                       | 0.59                                                                                                |                                                                                                       |
|                              | 6001                                                                     | 36.65                                                                   | 6.11                                                                                                                  | 0.543                              | 53.19                                                   | 22.765                                                         | 42.8                                                                                    | 18.013                                                | 34.71                                                                     |                                                             | 0.545                                  |                                                       | 0.72                                                                                                |                                                                                                       |
|                              | 6091                                                                     | 40.71                                                                   | 6.45                                                                                                                  | 0.537                              | 58.41                                                   | 24.425                                                         | 41.8                                                                                    | 17.949                                                | 38.68                                                                     |                                                             | 0.540                                  |                                                       | 0.85                                                                                                |                                                                                                       |

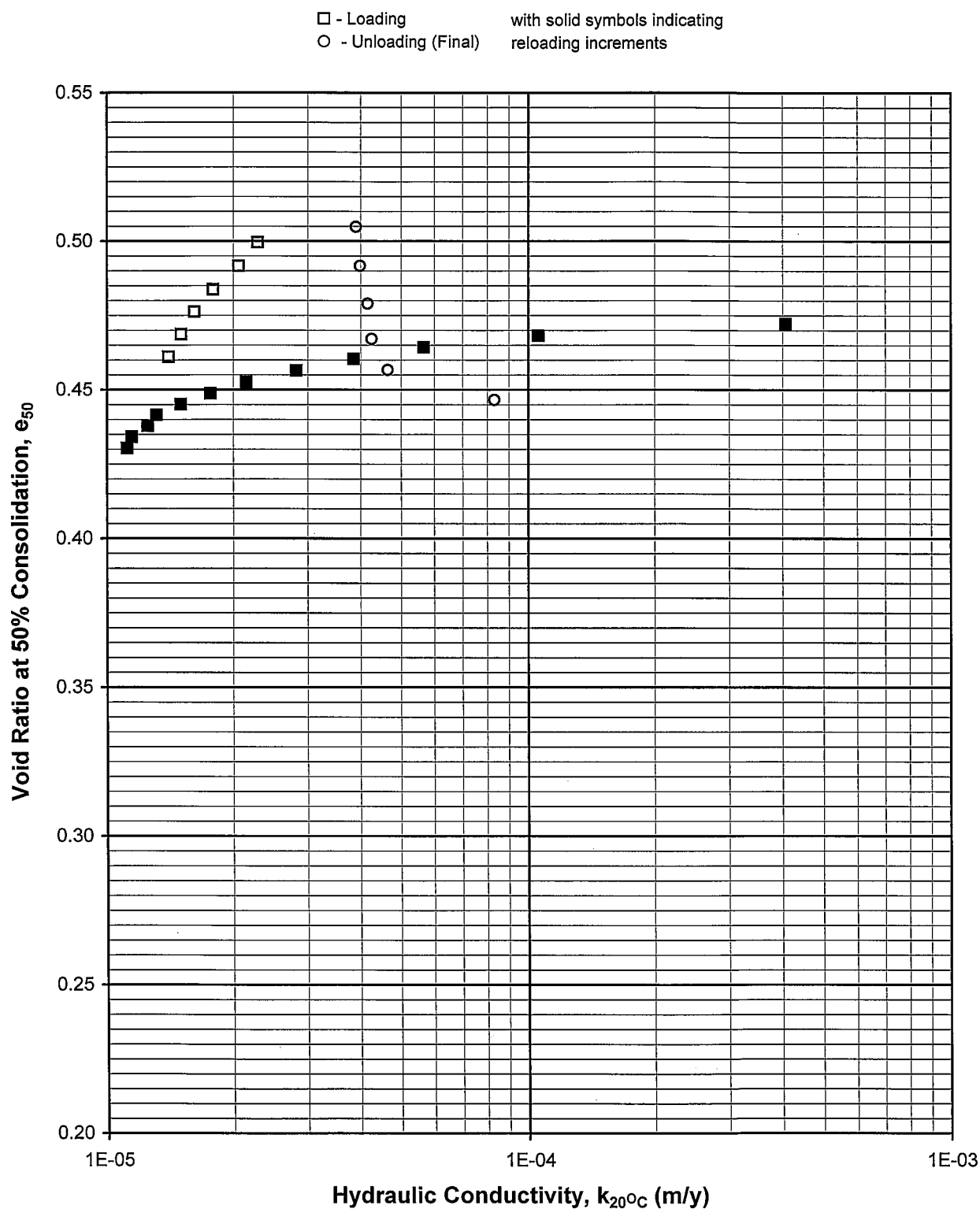


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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-13A - Depth 121.0 - 123.0 ft  
 Boring B-2304UD



# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-6 File Name: B-2304\_UD13a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Meas.; ☐ Assumed Ring No.: 16  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.661  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                 |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2304UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =              | No. Layers =            |
| Sample No.: UD-13                                  | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =             | Drop (in.) =            |
| Depth (ft): 121.0 - 123.0                          | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                   | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                 | Initial - Trimming Location                              |                         |             | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|------------------------------------|----------------------------------------------------------|-------------------------|-------------|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                    | Top (W1)                                                 | Bottom (W2)             | Sides (W3)  |                                       | Mass Moist Soil + Ring (g)                                 | 340.05  | 339.57 |
| Container No.                      | 907                                                      | 2038                    | 2044        | 752                                   | Mass Ring (g)                                              | 215.06  |        |
| Mass Moist Soil + Container (g)    | 139.25                                                   | 117.16                  | 111.77      | 73.89                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 124.99  | 124.51 |
| Mass Dry Soil + Container (g)      | 121.99                                                   | 103.39                  | 99.53       | 67.17                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                 | 31.93                                                    | 30.51                   | 30.85       | 31.99                                 | Container No.                                              |         | 2041   |
| WATER CONTENT (%)                  | 19.17                                                    | 18.89                   | 17.82       | 19.10                                 | Mass Dry Soil + Container (g)                              |         | 30.85  |
| Avg. Initial Water Content, W4 (%) | 18.63                                                    | Final W <sub>at</sub> : | X   Slice ; | Whole Spec.                           | Mass Container (g)                                         |         | 30.79  |
|                                    | See attached data sheet(s) for additional water contents |                         |             |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 0.06   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.060 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.300                                                                                                                                                                       | 0.000                                  | 12.450                                    | 12.990                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.244                                                              | 12.430 |
| 19.210                                                                                                                                                                       | 0.000                                  | 12.340                                    | 12.910                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 12.940 |
| 19.220                                                                                                                                                                       | 0.000                                  | 12.470                                    | 12.960                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.244                                                              | 18.550 |
| 19.270                                                                                                                                                                       | 0.000                                  | 12.510                                    | 12.940                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.220                                                                                                                                                                       | 0.000                                  | 12.380                                    | 12.900                      | Initial Height, $H_o$                                   |  | 19.244                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             |                                                         |  | Final Soil Height Measurement, $H_{f,m}$                            |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             |                                                         |  | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               |        |
|                                                                                                                                                                              |                                        |                                           |                             |                                                         |  | -0.94                                                               |        |

| Estimated Initial Unit Weight                                                                         |                                    | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 128.07                                                                  | Dry, $\gamma_{d,o}$ (pcf) = 107.96 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |                                    | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/25/2008 Date: 3/25/2008 Final Calc. By: LF Date: 4/3/2008  
 Reviewed By: HP 4P

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-6 File Name: B-2304\_UD13a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 19.17                    | 104.89                   | 90.9                         | 98.5                  | 101.4 |
| 2                | " Bottom, W2          | 18.89                    | 105.13                   | 90.2                         | 97.7                  | 100.6 |
| 3                | " Sides, W3           | 17.82                    | 106.08                   | 87.2                         | 94.6                  | 97.4  |
| 4                | " Average, W4         | 18.63                    | 105.36                   | 89.5                         | 97.0                  | 99.8  |
| 5                | " Back Calculated (1) | 19.49                    | 104.60 (3)               | 91.8                         | 99.4                  | 102.3 |
| 6                | Final                 | 19.10                    | 104.60 (2)               | 91.8                         | 99.4                  | 102.3 |

## Calculated Specific Gravity for Final Saturation = 100%:

Used Cal. Routine No. 5 to obtain the mass of dry soil  
 and final height by: ☒ Measurement; ☐ Dial Change.  
 Back Cal.  $G_s$  = 2.702  
 Avg.  $G_s$  (measured/assumed) & Back Cal.  $G_s$  = 2.706

## Calculation Constant, K

= (unit conversion) /  $G_s \times \rho_w \times A_r$

Estimated,  $K_e$  0.11676  
 Final Selected,  $K_f$  0.11676

## Calculated Mass Dry Soil for Final Saturation = 100%:

using measured/assumed  $G_s$

and final height by: ☒ Measurement; ☐ Dial Change.

Back Cal. Mass Dry Soil, (g) = 104.41

Avg. Back Calculated and Measured Mass Dry Soil (g) = 104.51

## Summary of Specimen Physical Properties

|                       |                      |               |                             |                                     |                                                                |                                    |                                                                        |                         |
|-----------------------|----------------------|---------------|-----------------------------|-------------------------------------|----------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------|-------------------------|
| Specific Gravity      |                      |               | Assumed                     |                                     | To make $S_r = 100\%$ at end of test.                          |                                    |                                                                        |                         |
| $G_s = 2.710$         |                      | X             | Measured                    |                                     | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_r = 100\%$ |                                    |                                                                        |                         |
| Mass Dry Soil, (g)    | Initial: 104.60      | X             | From Cal. Routine No.       | 5                                   | Note: Routine #5 is based on final measurements.               |                                    |                                                                        |                         |
|                       | Final (4): NA        |               | Make $S_r = 100\%$ , or;    |                                     | Avg. of measured & make $S_r = 100\%$                          |                                    |                                                                        |                         |
| Initial Height (mm) = |                      |               | 19.24                       | X                                   | Measured ;                                                     |                                    | Back Calculated                                                        | Back-cal. Sat. (%) = NA |
| Final Height (mm) =   |                      |               | 18.55                       | X                                   | Measured ;                                                     |                                    | Initial $H_o$ & dial change during loading                             |                         |
|                       | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                              | Height of Solids, $H_s$ (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) : |                         |
| Initial               | 19.5                 | 0.576         | 91.8                        | 128.1                               | 107.2                                                          | 12.213                             | From                                                                   | To (ksf)                |
| Final                 | 19.0                 | 0.519         | 99.4                        | 132.3                               | 111.2                                                          | NA                                 | NA                                                                     | NA                      |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 62 | Minus 200 (%) |
| Casagrande Method      | 28.20             | NA                                | 0.145 | 0.045 | 2.6 | Plastic Limit (PL)    | 18 | 92.9          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 44 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP HP

Date: 4/4/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686      Test Station No.: CRS-6      File Name: B-2304\_UD13a  
 Task No.: NA      Date: Start: 3/25/2008      Initial Height,  $H_0$  (mm): 19.24  
 Project Name: Exelon (Victoria)      Completed: 4/3/2008      Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6608  
 Test: Initial / Pressure      Gauge Back Pressure,  $U_G$  (psi): 70      ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values:      Back Pressure,  $U_{b,BE}$  (psi): 70.06105 ,V: 0.022486534      Piston Uplift,  $P_{up}$  (lbf): 34.40  
                                          Back Pressure,  $U_{b,CS}$  (psi): 70.05501 ,V: 0.022484538      Setup  $DT_{ref}$  (V): 0.001549332  
 Displacement Transducer No.: DT-025      Calib. Factor (mm/V): 228.61978      Ch. No.: 2  
 Pore Press. Transducer No.: PT-112      Calib. Factor (psi/V): 3029.91431      Ref. Zero (V): -0.000637      Ch. No.: 3  
 Force Cell No.: FT-100      Calib. Factor (lbf/V): -468015.73      Ref. Zero (V): -0.000484      Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
     US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF      Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 85                    | 14 : 55 : 21         |                                                                    | 0.10                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 85                    | 15 : 20 : 58         |                                                                    | 1.42                                                        |                                                            | 0.039                                                         | 0.000                                                                 | 0.039                                                                   |                                                                              |
| BE                           | 86                    | 09 : 17 : 23         |                                                                    | 2.72                                                        | 0.001                                                      | 0.026                                                         | 0.000                                                                 | 0.026                                                                   |                                                                              |
| CS                           | 86                    | 09 : 17 : 27         | 0                                                                  | 2.72                                                        | 0.000                                                      | 0.026                                                         | 0.000                                                                 | 0.026                                                                   |                                                                              |
|                              | 86                    | 10 : 09 : 23         | 52                                                                 | 6.47                                                        | 1.452                                                      | 0.098                                                         | 0.000                                                                 | 0.098                                                                   | 0.432                                                                        |
|                              | 86                    | 11 : 28 : 08         | 131                                                                | 9.47                                                        | 3.040                                                      | 0.178                                                         | 0.000                                                                 | 0.178                                                                   | 0.318                                                                        |
|                              | 86                    | 13 : 21 : 11         | 244                                                                | 12.05                                                       | 2.835                                                      | 0.273                                                         | 0.000                                                                 | 0.273                                                                   | 0.259                                                                        |
|                              | 86                    | 15 : 31 : 13         | 374                                                                | 17.12                                                       | 5.710                                                      | 0.373                                                         | 0.000                                                                 | 0.373                                                                   | 0.241                                                                        |
|                              | 86                    | 17 : 41 : 14         | 504                                                                | 23.27                                                       | 9.397                                                      | 0.480                                                         | 0.000                                                                 | 0.480                                                                   | 0.255                                                                        |
| US                           | 86                    | 19 : 51 : 16         | 634                                                                | 29.22                                                       | 12.633                                                     | 0.579                                                         | 0.000                                                                 | 0.579                                                                   | 0.238                                                                        |
|                              | 86                    | 22 : 01 : 17         | 764                                                                | 34.86                                                       | 15.312                                                     | 0.674                                                         | 0.000                                                                 | 0.674                                                                   | 0.228                                                                        |
|                              | 87                    | 00 : 11 : 19         | 894                                                                | 40.91                                                       | 18.236                                                     | 0.768                                                         | 0.000                                                                 | 0.768                                                                   | 0.226                                                                        |
|                              | 87                    | 02 : 21 : 21         | 1024                                                               | 47.77                                                       | 21.879                                                     | 0.868                                                         | 0.000                                                                 | 0.868                                                                   | 0.240                                                                        |
|                              | 87                    | 04 : 31 : 22         | 1154                                                               | 54.18                                                       | 25.064                                                     | 0.966                                                         | 0.000                                                                 | 0.966                                                                   | 0.234                                                                        |
|                              | 87                    | 06 : 41 : 24         | 1284                                                               | 60.04                                                       | 27.684                                                     | 1.058                                                         | 0.000                                                                 | 1.058                                                                   | 0.221                                                                        |
|                              | 87                    | 08 : 51 : 25         | 1414                                                               | 66.57                                                       | 31.007                                                     | 1.148                                                         | 0.000                                                                 | 1.148                                                                   | 0.214                                                                        |
|                              | 87                    | 11 : 01 : 27         | 1544                                                               | 74.15                                                       | 35.290                                                     | 1.243                                                         | 0.000                                                                 | 1.243                                                                   | 0.230                                                                        |
|                              | 87                    | 13 : 11 : 29         | 1674                                                               | 81.03                                                       | 38.398                                                     | 1.340                                                         | 0.000                                                                 | 1.340                                                                   | 0.233                                                                        |
|                              | 87                    | 15 : 21 : 31         | 1804                                                               | 87.62                                                       | 41.029                                                     | 1.432                                                         | 0.000                                                                 | 1.432                                                                   | 0.220                                                                        |
|                              | 87                    | 17 : 31 : 33         | 1934                                                               | 94.64                                                       | 44.029                                                     | 1.522                                                         | 0.000                                                                 | 1.522                                                                   | 0.215                                                                        |
|                              | 87                    | 19 : 41 : 35         | 2064                                                               | 103.17                                                      | 48.073                                                     | 1.613                                                         | 0.000                                                                 | 1.613                                                                   | 0.219                                                                        |
| UE                           | 87                    | 21 : 51 : 38         | 2194                                                               | 111.24                                                      | 51.567                                                     | 1.707                                                         | 0.000                                                                 | 1.707                                                                   | 0.224                                                                        |
|                              | 88                    | 00 : 01 : 39         | 2324                                                               | 118.64                                                      | 54.243                                                     | 1.793                                                         | 0.000                                                                 | 1.793                                                                   | 0.207                                                                        |
|                              | 88                    | 02 : 11 : 41         | 2454                                                               | 126.78                                                      | 57.351                                                     | 1.879                                                         | 0.000                                                                 | 1.879                                                                   | 0.205                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 88                    | 03 : 19 : 00         | 2522                                                               | 131.90                                                      | 59.745                                                     | 1.925                                                         | 0.000                                                                 | 1.925                                                                   | 0.214                                                                        |
|                              | 88                    | 03 : 21 : 41         | 2524                                                               | 131.52                                                      | 59.602                                                     | 1.926                                                         | 0.000                                                                 | 1.926                                                                   | 0.109                                                                        |
|                              | 88                    | 08 : 21 : 46         | 2824                                                               | 92.97                                                       | 21.070                                                     | 1.936                                                         | 0.000                                                                 | 1.936                                                                   | 0.011                                                                        |
|                              | 88                    | 13 : 21 : 49         | 3124                                                               | 70.38                                                       | 7.529                                                      | 1.895                                                         | 0.000                                                                 | 1.895                                                                   | -0.043                                                                       |
|                              | 88                    | 18 : 21 : 53         | 3424                                                               | 52.77                                                       | 1.447                                                      | 1.833                                                         | 0.000                                                                 | 1.833                                                                   | -0.065                                                                       |
|                              | 88                    | 23 : 21 : 57         | 3725                                                               | 39.19                                                       | -2.101                                                     | 1.751                                                         | 0.000                                                                 | 1.751                                                                   | -0.085                                                                       |
|                              | 89                    | 04 : 22 : 02         | 4025                                                               | 29.68                                                       | -4.206                                                     | 1.663                                                         | 0.000                                                                 | 1.663                                                                   | -0.092                                                                       |
| US                           | 89                    | 09 : 22 : 06         | 4325                                                               | 21.79                                                       | -5.626                                                     | 1.564                                                         | 0.000                                                                 | 1.564                                                                   | -0.103                                                                       |
|                              | 89                    | 14 : 22 : 11         | 4625                                                               | 15.41                                                       | -6.664                                                     | 1.452                                                         | 0.000                                                                 | 1.452                                                                   | -0.116                                                                       |
|                              | 89                    | 19 : 22 : 14         | 4925                                                               | 10.92                                                       | -7.409                                                     | 1.333                                                         | 0.000                                                                 | 1.333                                                                   | -0.123                                                                       |
|                              | 90                    | 00 : 22 : 17         | 5225                                                               | 7.54                                                        | -7.813                                                     | 1.228                                                         | 0.000                                                                 | 1.228                                                                   | -0.110                                                                       |
| UE                           | 90                    | 05 : 22 : 20         | 5525                                                               | 4.58                                                        | -8.145                                                     | 1.104                                                         | 0.000                                                                 | 1.104                                                                   | -0.129                                                                       |
|                              | 90                    | 05 : 34 : 16         | 5537                                                               | 4.40                                                        | -8.156                                                     | 1.099                                                         | 0.000                                                                 | 1.099                                                                   | -0.128                                                                       |
|                              | 90                    | 05 : 42 : 20         | 5545                                                               | 4.81                                                        | -8.157                                                     | 1.097                                                         | 0.000                                                                 | 1.097                                                                   | -0.064                                                                       |
|                              | 90                    | 07 : 02 : 22         | 5625                                                               | 11.51                                                       | -7.988                                                     | 1.122                                                         | 0.000                                                                 | 1.122                                                                   | 0.095                                                                        |
|                              | 90                    | 08 : 22 : 23         | 5705                                                               | 16.93                                                       | -7.629                                                     | 1.172                                                         | 0.000                                                                 | 1.172                                                                   | 0.195                                                                        |
| US                           | 90                    | 09 : 42 : 23         | 5785                                                               | 21.31                                                       | -7.144                                                     | 1.222                                                         | 0.000                                                                 | 1.222                                                                   | 0.197                                                                        |
|                              | 90                    | 11 : 02 : 24         | 5865                                                               | 25.66                                                       | -6.498                                                     | 1.275                                                         | 0.000                                                                 | 1.275                                                                   | 0.206                                                                        |
|                              | 90                    | 12 : 22 : 26         | 5945                                                               | 30.55                                                       | -5.603                                                     | 1.332                                                         | 0.000                                                                 | 1.332                                                                   | 0.221                                                                        |
|                              | 90                    | 13 : 42 : 26         | 6025                                                               | 35.52                                                       | -4.341                                                     | 1.390                                                         | 0.000                                                                 | 1.390                                                                   | 0.227                                                                        |
|                              | 90                    | 15 : 02 : 27         | 6105                                                               | 40.40                                                       | -2.594                                                     | 1.447                                                         | 0.000                                                                 | 1.447                                                                   | 0.221                                                                        |
|                              | 90                    | 16 : 22 : 29         | 6185                                                               | 45.60                                                       | -0.220                                                     | 1.500                                                         | 0.000                                                                 | 1.500                                                                   | 0.208                                                                        |
|                              | 90                    | 17 : 42 : 30         | 6265                                                               | 50.97                                                       | 2.950                                                      | 1.551                                                         | 0.000                                                                 | 1.551                                                                   | 0.197                                                                        |
|                              | 90                    | 19 : 02 : 31         | 6345                                                               | 56.77                                                       | 6.923                                                      | 1.598                                                         | 0.000                                                                 | 1.598                                                                   | 0.183                                                                        |
|                              | 90                    | 20 : 22 : 32         | 6425                                                               | 63.07                                                       | 11.347                                                     | 1.644                                                         | 0.000                                                                 | 1.644                                                                   | 0.181                                                                        |
|                              | 90                    | 21 : 42 : 33         | 6505                                                               | 70.53                                                       | 16.403                                                     | 1.692                                                         | 0.000                                                                 | 1.692                                                                   | 0.185                                                                        |
|                              | 90                    | 23 : 02 : 33         | 6585                                                               | 77.86                                                       | 21.641                                                     | 1.739                                                         | 0.000                                                                 | 1.739                                                                   | 0.185                                                                        |
|                              | 91                    | 00 : 22 : 34         | 6665                                                               | 85.36                                                       | 26.731                                                     | 1.785                                                         | 0.000                                                                 | 1.785                                                                   | 0.178                                                                        |
|                              | 91                    | 01 : 42 : 35         | 6745                                                               | 92.62                                                       | 31.322                                                     | 1.830                                                         | 0.000                                                                 | 1.830                                                                   | 0.175                                                                        |
|                              | 91                    | 03 : 02 : 36         | 6825                                                               | 99.55                                                       | 35.182                                                     | 1.874                                                         | 0.000                                                                 | 1.874                                                                   | 0.170                                                                        |
|                              | 91                    | 04 : 22 : 37         | 6905                                                               | 106.49                                                      | 38.674                                                     | 1.916                                                         | 0.000                                                                 | 1.916                                                                   | 0.165                                                                        |
|                              | 91                    | 05 : 42 : 39         | 6985                                                               | 113.94                                                      | 42.475                                                     | 1.961                                                         | 0.000                                                                 | 1.961                                                                   | 0.174                                                                        |
|                              | 91                    | 07 : 02 : 40         | 7065                                                               | 121.93                                                      | 46.716                                                     | 2.006                                                         | 0.000                                                                 | 2.006                                                                   | 0.175                                                                        |
| UE                           | 91                    | 08 : 22 : 41         | 7145                                                               | 129.56                                                      | 50.642                                                     | 2.053                                                         | 0.000                                                                 | 2.053                                                                   | 0.187                                                                        |
|                              | 91                    | 08 : 47 : 37         | 7170                                                               | 131.86                                                      | 51.815                                                     | 2.069                                                         | 0.000                                                                 | 2.069                                                                   | 0.196                                                                        |
|                              | 91                    | 08 : 52 : 41         | 7175                                                               | 131.18                                                      | 51.623                                                     | 2.071                                                         | 0.000                                                                 | 2.071                                                                   | 0.112                                                                        |
|                              | 91                    | 15 : 12 : 45         | 7555                                                               | 87.70                                                       | 13.521                                                     | 2.057                                                         | 0.000                                                                 | 2.057                                                                   | -0.012                                                                       |
|                              | 91                    | 21 : 32 : 50         | 7935                                                               | 62.64                                                       | 2.989                                                      | 1.991                                                         | 0.000                                                                 | 1.991                                                                   | -0.054                                                                       |
| US                           | 92                    | 03 : 52 : 55         | 8315                                                               | 44.13                                                       | -1.915                                                     | 1.896                                                         | 0.000                                                                 | 1.896                                                                   | -0.078                                                                       |
|                              | 92                    | 10 : 13 : 01         | 8696                                                               | 30.57                                                       | -4.697                                                     | 1.771                                                         | 0.000                                                                 | 1.771                                                                   | -0.103                                                                       |
|                              | 92                    | 16 : 33 : 06         | 9076                                                               | 21.12                                                       | -6.381                                                     | 1.654                                                         | 0.000                                                                 | 1.654                                                                   | -0.096                                                                       |
|                              | 92                    | 22 : 53 : 12         | 9456                                                               | 13.43                                                       | -7.420                                                     | 1.519                                                         | 0.000                                                                 | 1.519                                                                   | -0.111                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]



# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-6 ☒ Undisturbed or; ☐ Reconstituted - Specimen. File Name: B-2304\_UD1:  
 Task No.: NA Date; Start: 3/25/2008 Back Pressure,  $U_{b,cs}$  (psi): 70.1 Piston Uplift,  $P_{up}$  (lb): 34.40  
 Project Name: Exelon (Victoria) Completed: 4/3/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$   
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Ring No.: 16 Area,  $A_r$  (cm<sup>2</sup>): 31.661 Solids Ht.,  $H_s$  (mm): 12.213 Specific Gravity,  $G_s = 2.710$  ☒ Meas.; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.24 Water 19.5 Void 0.576 Deg. of 91.8 Total Unit 128.1 Dry Unit 107.2  
**Final:** (mm):  $H_f$ : 18.55 Content,  $w$  (%): 19.0 Ratio,  $e$ : 0.519 Sat.,  $S$  (%): 99.4 Weight,  $\gamma_t$  (pcf): 132.3 Weight,  $\gamma_d$  (pcf): 111.2

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to errati
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP ~~HP~~

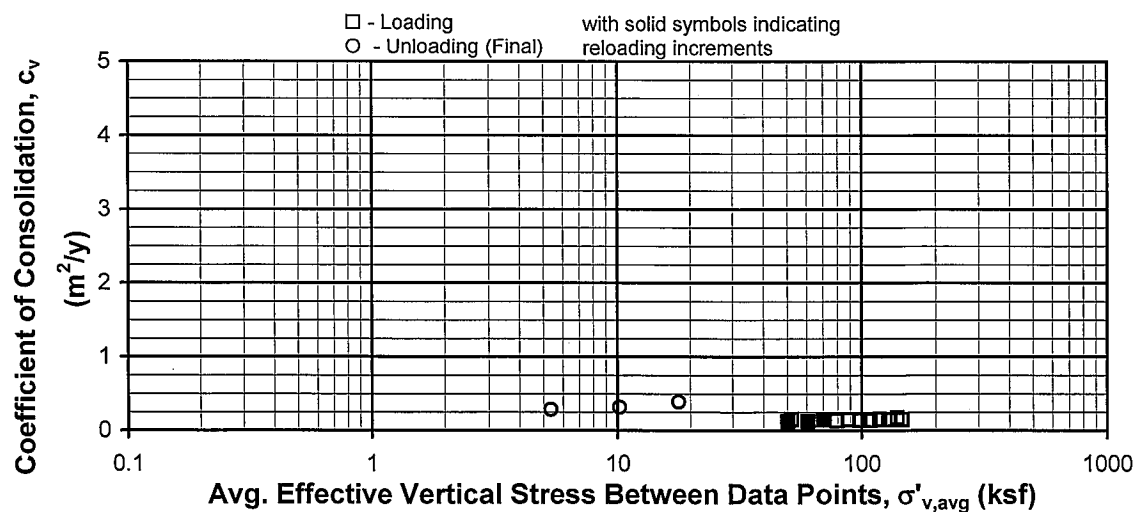
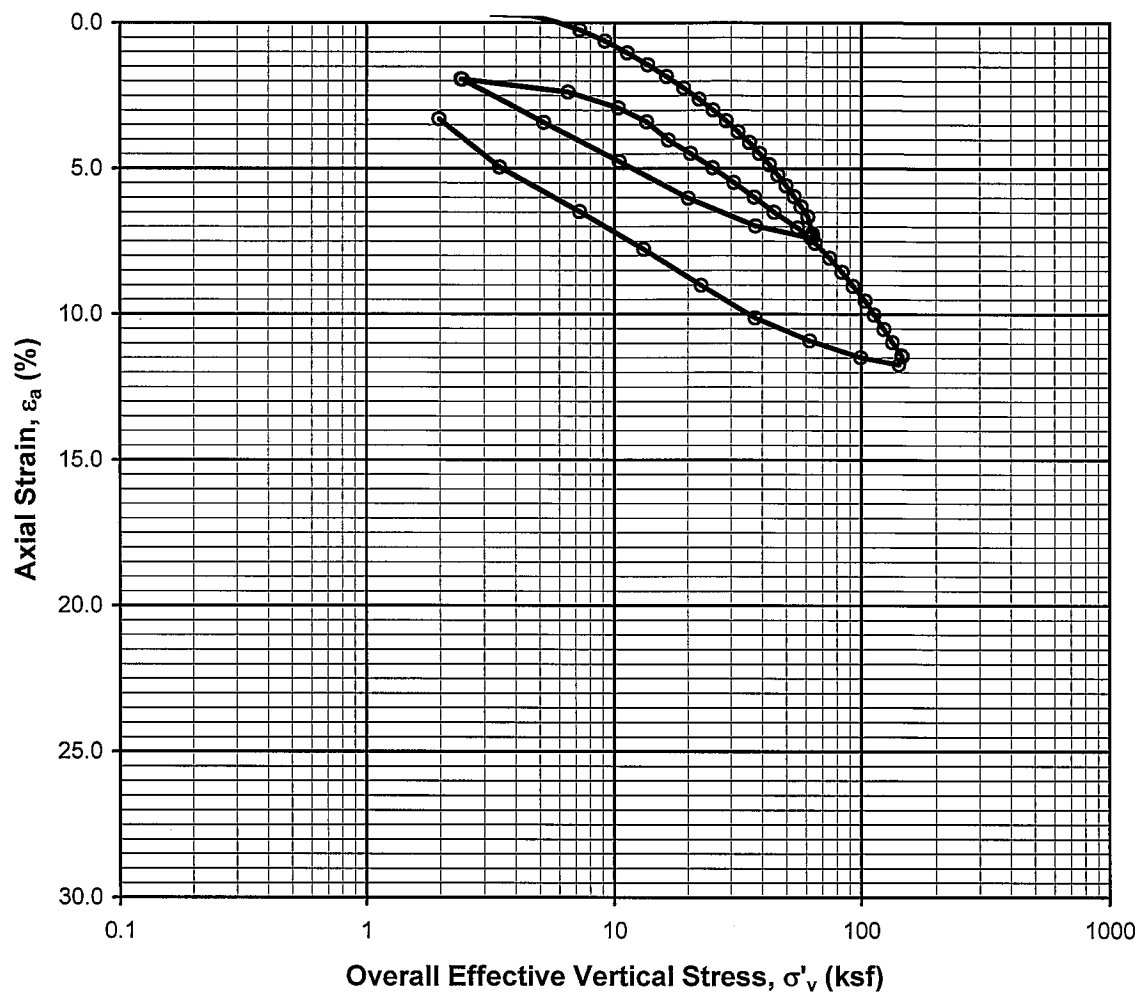
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n} (\epsilon_{ac,n})$<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n (2)$<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                         | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                   |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k @ 20^\circ C$<br>(m/y) |                                                                                                |                                                                                                        |
| S                            |                                                                          |                                                                         |                                                                                                                   |                                    | 0.10                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                         |                                                                                                |                                                                                                        |
| BS                           |                                                                          |                                                                         | 0.20                                                                                                              | 0.572                              | 1.42                                                    |                                                                |                                                                                         | 19.205                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                         |                                                                                                |                                                                                                        |
| BE                           |                                                                          | 2.72                                                                    | 0.14                                                                                                              | 0.574                              | 2.72                                                    | 0.001                                                          | 0.0                                                                                     | 19.218                                                |                                                                           |                                                                     | 0.573                                  |                                                         |                                                                                                |                                                                                                        |
| CS                           | 0                                                                        | 2.72                                                                    | 0.14                                                                                                              | 0.574                              | 2.72                                                    | 0.000                                                          | 0.0                                                                                     | 19.218                                                |                                                                           |                                                                     | 0.574                                  |                                                         |                                                                                                |                                                                                                        |
|                              | 52                                                                       | 5.46                                                                    | 0.51                                                                                                              | 0.568                              | 6.47                                                    | 1.452                                                          | 22.4                                                                                    | 19.146                                                | 4.09                                                                      |                                                                     | 0.571                                  |                                                         |                                                                                                |                                                                                                        |
|                              | 131                                                                      | 7.31                                                                    | 0.93                                                                                                              | 0.561                              | 9.47                                                    | 3.040                                                          | 32.1                                                                                    | 19.066                                                | 6.39                                                                      |                                                                     | 0.564                                  |                                                         |                                                                                                |                                                                                                        |
|                              | 244                                                                      | 10.08                                                                   | 1.42                                                                                                              | 0.553                              | 12.05                                                   | 2.835                                                          | 23.5                                                                                    | 18.971                                                | 8.70                                                                      |                                                                     | 0.557                                  |                                                         |                                                                                                |                                                                                                        |
|                              | 374                                                                      | 13.06                                                                   | 1.94                                                                                                              | 0.545                              | 17.12                                                   | 5.710                                                          | 33.4                                                                                    | 18.871                                                | 11.57                                                                     |                                                                     | 0.549                                  |                                                         |                                                                                                |                                                                                                        |
|                              | 504                                                                      | 16.49                                                                   | 2.49                                                                                                              | 0.536                              | 23.27                                                   | 9.397                                                          | 40.4                                                                                    | 18.764                                                | 14.77                                                                     |                                                                     | 0.541                                  |                                                         |                                                                                                |                                                                                                        |
| US                           | 634                                                                      | 20.03                                                                   | 3.01                                                                                                              | 0.528                              | 29.22                                                   | 12.633                                                         | 43.2                                                                                    | 18.665                                                | 18.26                                                                     |                                                                     | 0.532                                  |                                                         |                                                                                                |                                                                                                        |
|                              | 764                                                                      | 23.70                                                                   | 3.50                                                                                                              | 0.521                              | 34.86                                                   | 15.312                                                         | 43.9                                                                                    | 18.570                                                | 21.87                                                                     |                                                                     | 0.524                                  |                                                         | 0.31                                                                                           |                                                                                                        |
|                              | 894                                                                      | 27.61                                                                   | 3.99                                                                                                              | 0.513                              | 40.91                                                   | 18.236                                                         | 44.6                                                                                    | 18.476                                                | 25.66                                                                     |                                                                     | 0.517                                  |                                                         | 0.55                                                                                           |                                                                                                        |
|                              | 1024                                                                     | 31.76                                                                   | 4.51                                                                                                              | 0.505                              | 47.77                                                   | 21.879                                                         | 45.8                                                                                    | 18.376                                                | 29.68                                                                     |                                                                     | 0.509                                  |                                                         | 0.77                                                                                           |                                                                                                        |
|                              | 1154                                                                     | 35.81                                                                   | 5.02                                                                                                              | 0.497                              | 54.18                                                   | 25.064                                                         | 46.3                                                                                    | 18.278                                                | 33.79                                                                     |                                                                     | 0.501                                  |                                                         | 0.82                                                                                           |                                                                                                        |
|                              | 1284                                                                     | 39.76                                                                   | 5.50                                                                                                              | 0.489                              | 60.04                                                   | 27.684                                                         | 46.1                                                                                    | 18.186                                                | 37.79                                                                     |                                                                     | 0.493                                  |                                                         | 0.83                                                                                           |                                                                                                        |
|                              | 1414                                                                     | 43.83                                                                   | 5.96                                                                                                              | 0.482                              | 66.57                                                   | 31.007                                                         | 46.6                                                                                    | 18.096                                                | 41.79                                                                     |                                                                     | 0.485                                  |                                                         | 1.00                                                                                           |                                                                                                        |
|                              | 1544                                                                     | 48.20                                                                   | 6.46                                                                                                              | 0.474                              | 74.15                                                   | 35.290                                                         | 47.6                                                                                    | 18.001                                                | 46.02                                                                     | 0.11                                                                | 0.478                                  | 2.29E-05                                                | 1.19                                                                                           |                                                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

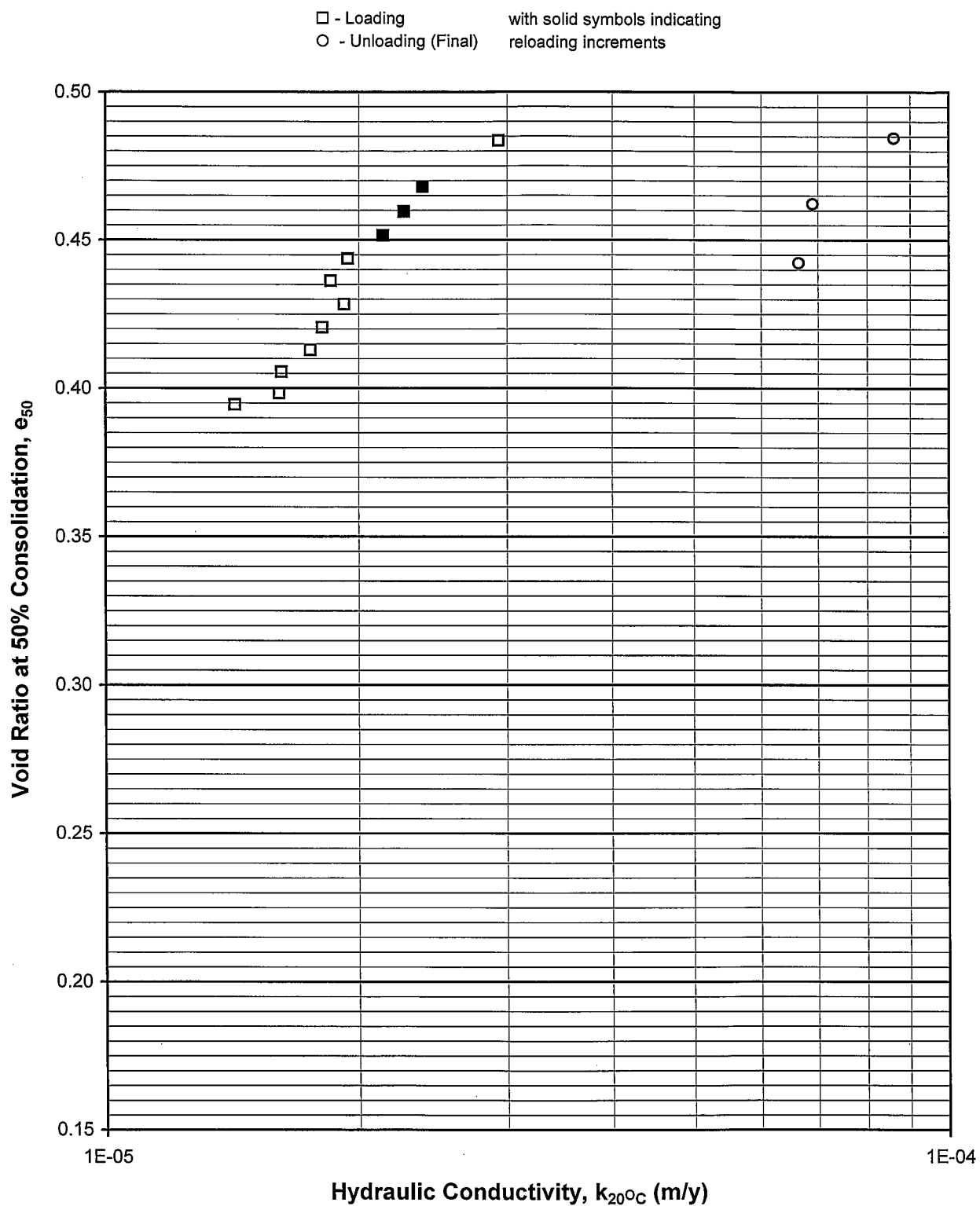
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                       | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>( $m/y$ ) |                                                                                                |                                                                                                  |
|                              | 1674                                                                     | 52.81                                                                   | 6.97                                                                                                                        | 0.466                              | 81.03                                                   | 38.398                                                         | 47.4                                                                                    | 17.904                                                | 50.51                                                                     | 0.09                                                        | 0.470                                  | 2.06E-05                                              | 1.10                                                                                           |                                                                                                  |
|                              | 1804                                                                     | 57.51                                                                   | 7.44                                                                                                                        | 0.458                              | 87.62                                                   | 41.029                                                         | 46.8                                                                                    | 17.812                                                | 55.16                                                                     | 0.08                                                        | 0.462                                  | 1.79E-05                                              | 1.10                                                                                           |                                                                                                  |
|                              | 1934                                                                     | 62.35                                                                   | 7.91                                                                                                                        | 0.451                              | 94.64                                                   | 44.029                                                         | 46.5                                                                                    | 17.722                                                | 59.93                                                                     | 0.08                                                        | 0.455                                  | 1.61E-05                                              | 1.23                                                                                           |                                                                                                  |
|                              | 2064                                                                     | 67.91                                                                   | 8.38                                                                                                                        | 0.444                              | 103.17                                                  | 48.073                                                         | 46.6                                                                                    | 17.631                                                | 65.13                                                                     | 0.09                                                        | 0.447                                  | 1.50E-05                                              | 1.52                                                                                           |                                                                                                  |
| UE                           | 2194                                                                     | 73.44                                                                   | 8.87                                                                                                                        | 0.436                              | 111.24                                                  | 51.567                                                         | 46.4                                                                                    | 17.537                                                | 70.67                                                                     | 0.08                                                        | 0.440                                  | 1.40E-05                                              | 1.45                                                                                           |                                                                                                  |
|                              | 2324                                                                     | 78.95                                                                   | 9.32                                                                                                                        | 0.429                              | 118.64                                                  | 54.243                                                         | 45.7                                                                                    | 17.451                                                | 76.19                                                                     |                                                             | 0.432                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 2454                                                                     | 84.86                                                                   | 9.76                                                                                                                        | 0.422                              | 126.78                                                  | 57.351                                                         | 45.2                                                                                    | 17.365                                                | 81.91                                                                     |                                                             | 0.425                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 2522                                                                     | 88.22                                                                   | 10.00                                                                                                                       | 0.418                              | 131.90                                                  | 59.745                                                         | 45.3                                                                                    | 17.319                                                | 86.54                                                                     |                                                             | 0.420                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 2524                                                                     | 87.95                                                                   | 10.01                                                                                                                       | 0.418                              | 131.52                                                  | 59.602                                                         | 45.3                                                                                    | 17.318                                                | 88.09                                                                     |                                                             | 0.418                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 2824                                                                     | 78.34                                                                   | 10.06                                                                                                                       | 0.417                              | 92.97                                                   | 21.070                                                         | 22.7                                                                                    | 17.308                                                | 83.14                                                                     |                                                             | 0.418                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 3124                                                                     | 65.27                                                                   | 9.85                                                                                                                        | 0.421                              | 70.38                                                   | 7.529                                                          | 10.7                                                                                    | 17.349                                                | 71.80                                                                     |                                                             | 0.419                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 3424                                                                     | 51.80                                                                   | 9.53                                                                                                                        | 0.426                              | 52.77                                                   | 1.447                                                          | 2.7                                                                                     | 17.411                                                | 58.54                                                                     |                                                             | 0.423                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 3725                                                                     | 40.58                                                                   | 9.10                                                                                                                        | 0.432                              | 39.19                                                   | -2.101                                                         | -5.4                                                                                    | 17.493                                                | 46.19                                                                     |                                                             | 0.429                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 4025                                                                     | 32.42                                                                   | 8.64                                                                                                                        | 0.440                              | 29.68                                                   | -4.206                                                         | -14.2                                                                                   | 17.581                                                | 36.50                                                                     |                                                             | 0.436                                  |                                                       |                                                                                                |                                                                                                  |
| US                           | 4325                                                                     | 25.40                                                                   | 8.13                                                                                                                        | 0.448                              | 21.79                                                   | -5.626                                                         | -25.8                                                                                   | 17.680                                                | 28.91                                                                     |                                                             | 0.444                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 4625                                                                     | 19.58                                                                   | 7.55                                                                                                                        | 0.457                              | 15.41                                                   | -6.664                                                         | -43.2                                                                                   | 17.792                                                | 22.49                                                                     | 0.33                                                        | 0.452                                  | 5.09E-05                                              | 1.21                                                                                           |                                                                                                  |
|                              | 4925                                                                     | 15.42                                                                   | 6.93                                                                                                                        | 0.467                              | 10.92                                                   | -7.409                                                         | -67.9                                                                                   | 17.911                                                | 17.50                                                                     | 0.22                                                        | 0.462                                  | 4.70E-05                                              | 1.61                                                                                           |                                                                                                  |
|                              | 5225                                                                     | 12.11                                                                   | 6.38                                                                                                                        | 0.475                              | 7.54                                                    | -7.813                                                         | -103.6                                                                                  | 18.016                                                | 13.77                                                                     | 0.17                                                        | 0.471                                  | 3.82E-05                                              | 1.85                                                                                           |                                                                                                  |
| UE                           | 5525                                                                     | 9.06                                                                    | 5.74                                                                                                                        | 0.485                              | 4.58                                                    | -8.145                                                         | -177.7                                                                                  | 18.140                                                | 10.58                                                                     | 0.17                                                        | 0.480                                  | 4.24E-05                                              | 2.37                                                                                           |                                                                                                  |
|                              | 5537                                                                     | 8.86                                                                    | 5.71                                                                                                                        | 0.486                              | 4.40                                                    | -8.156                                                         | -185.2                                                                                  | 18.145                                                | 8.96                                                                      |                                                             | 0.485                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 5545                                                                     | 9.31                                                                    | 5.70                                                                                                                        | 0.486                              | 4.81                                                    | -8.157                                                         | -169.7                                                                                  | 18.147                                                | 9.08                                                                      |                                                             | 0.486                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 5625                                                                     | 16.35                                                                   | 5.83                                                                                                                        | 0.484                              | 11.51                                                   | -7.988                                                         | -69.4                                                                                   | 18.122                                                | 12.83                                                                     |                                                             | 0.485                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 5705                                                                     | 21.70                                                                   | 6.09                                                                                                                        | 0.480                              | 16.93                                                   | -7.629                                                         | -45.1                                                                                   | 18.072                                                | 19.02                                                                     |                                                             | 0.482                                  |                                                       |                                                                                                |                                                                                                  |
| US                           | 5785                                                                     | 25.84                                                                   | 6.35                                                                                                                        | 0.476                              | 21.31                                                   | -7.144                                                         | -33.5                                                                                   | 18.022                                                | 23.77                                                                     |                                                             | 0.478                                  |                                                       |                                                                                                |                                                                                                  |
|                              | 5865                                                                     | 29.83                                                                   | 6.63                                                                                                                        | 0.471                              | 25.66                                                   | -6.498                                                         | -25.3                                                                                   | 17.969                                                | 27.84                                                                     |                                                             | 0.473                                  |                                                       | -0.73                                                                                          |                                                                                                  |
|                              | 5945                                                                     | 34.18                                                                   | 6.92                                                                                                                        | 0.467                              | 30.55                                                   | -5.603                                                         | -18.3                                                                                   | 17.912                                                | 32.00                                                                     |                                                             | 0.469                                  |                                                       | -1.79                                                                                          |                                                                                                  |
|                              | 6025                                                                     | 38.36                                                                   | 7.22                                                                                                                        | 0.462                              | 35.52                                                   | -4.341                                                         | -12.2                                                                                   | 17.854                                                | 36.27                                                                     |                                                             | 0.464                                  |                                                       | -3.23                                                                                          |                                                                                                  |
|                              | 6105                                                                     | 42.12                                                                   | 7.52                                                                                                                        | 0.457                              | 40.40                                                   | -2.594                                                         | -6.4                                                                                    | 17.797                                                | 40.24                                                                     |                                                             | 0.460                                  |                                                       | -5.90                                                                                          |                                                                                                  |
|                              | 6185                                                                     | 45.74                                                                   | 7.80                                                                                                                        | 0.453                              | 45.60                                                   | -0.220                                                         | -0.5                                                                                    | 17.744                                                | 43.93                                                                     |                                                             | 0.455                                  |                                                       | -18.77                                                                                         |                                                                                                  |
|                              | 6265                                                                     | 48.99                                                                   | 8.06                                                                                                                        | 0.449                              | 50.97                                                   | 2.950                                                          | 5.8                                                                                     | 17.693                                                | 47.36                                                                     | 4.01                                                        | 0.451                                  | 4.06E-04                                              | 23.32                                                                                          |                                                                                                  |

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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-4A - Depth 25.0 - 27.0 ft  
 Boring B-2319UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-4A - Depth 25.0 - 27.0 ft  
Boring B-2319UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-1 File Name: B-2319\_UD4a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas. ; ☐ Assumed Ring No.: 1  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.239  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                 |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2319UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =              | No. Layers =            |
| Sample No.: UD-4                                   | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =             | Drop (in.) =            |
| Depth (ft): 25.0 - 27.0                            | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   | Ref. Effort =                    | % Comp. =                       | $\pm$ Opt. =            |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                  |                                | Mass Moist Soil + Ring (g)                           | 330.88  | 332.26 |
| Container No.                                            | 654                         | 2028             | 2039                                        | 169                            | Mass Ring (g)                                        | 208.35  |        |
| Mass Moist Soil + Container (g)                          | 110.30                      | 125.10           | 132.74                                      | 61.26                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 122.53  | 123.91 |
| Mass Dry Soil + Container (g)                            | 97.94                       | 109.42           | 116.46                                      | 55.88                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 31.94                       | 30.63            | 30.61                                       | 30.01                          | Container No.                                        | 684     |        |
| WATER CONTENT (%)                                        | 18.73                       | 19.90            | 18.96                                       | 20.80                          | Mass Dry Soil + Container (g)                        | 25.39   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 19.20                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> Slice ; | Whole Spec.                    | Mass Container (g)                                   | 24.64   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.75    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.040 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 18.820                                                                                                                                                                       | 0.000                                  | 13.080                                    | 13.360                      | Avg. Reading on Soil, $d_{soil}$                        |  | 18.828                                                              | 13.078 |
| 18.820                                                                                                                                                                       | 0.000                                  | 12.940                                    | 13.300                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.312 |
| 18.850                                                                                                                                                                       | 0.000                                  | 13.090                                    | 13.260                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 18.828                                                              | 18.806 |
| 18.840                                                                                                                                                                       | 0.000                                  | 13.190                                    | 13.300                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 18.810                                                                                                                                                                       | 0.000                                  | 13.090                                    | 13.340                      | Initial Height, $H_o$                                   |  | 18.828                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 18.806                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | 0.56                                                                |        |

| Estimated Initial Unit Weight |                                                     |                                           |                             |
|-------------------------------|-----------------------------------------------------|-------------------------------------------|-----------------------------|
| Total, $\gamma_{t,o}$ (pcf) = | 130.06                                              | Dry, $\gamma_{d,o}$ (pcf) =               | 109.11                      |
| Filter Paper Used:            | <input checked="" type="checkbox"/> Whatman No. 54; | <input type="checkbox"/> Other            |                             |
| Incremental Test:             | Top & Bottom:                                       | <input type="checkbox"/> Yes ;            | <input type="checkbox"/> No |
| CRS Test:                     | Top Only:                                           | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No |

| Soil Extruded During Loading                            |      |
|---------------------------------------------------------|------|
| Container No.                                           |      |
| Mass Dry Soil + Cont. (g)                               | NA   |
| Mass Cont. (g)                                          | NA   |
| Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Yellowish Brown Fat CLAY with sand (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/28/2008 Date: 3/28/2008 Final Calc. By: LF Date: 4/6/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

## ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686      Test Station No.: CRS-1      File Name: B-2319\_UD4a  
 Task No.: NA      Specific Gravity,  $G_s$ : 2.720      ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |       |                      |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-------|----------------------|
|                  |                       |                          |                          | Height<br>Initial            | Meas. | Final Height<br>Dial |
| 1                | Initial, Top, W1      | 18.73                    | 103.20                   | 93.1                         | 100.0 | 98.5                 |
| 2                | " Bottom, W2          | 19.90                    | 102.19                   | 96.2                         | 103.1 | 101.5                |
| 3                | " Sides, W3           | 18.96                    | 103.00                   | 93.7                         | 100.7 | 99.1                 |
| 4                | " Average, W4         | 19.20                    | 102.80                   | 94.3                         | 101.3 | 99.7                 |
| 5                | " Back Calculated (1) | 18.58                    | 103.33 (3)               | 92.7                         | 99.7  | 98.1                 |
| 6                | Final                 | 20.80                    | 103.33 (2)               | 92.7                         | 99.7  | 98.1                 |

**Calculated Specific Gravity for Final Saturation = 100%:**

Used Cal. Routine No. 5 to obtain the mass of dry soil  
and final height by: ☒ Measurement; ☐ Dial Change.  
Back Cal.  $G_s$  = 2.715  
Avg.  $G_s$  (measured/assumed) & Back Cal.  $G_s$  = 2.717

Calculation Constant, K

$$= (\text{unit conversion}) / G_s \times \rho_w \times A_r$$

|                  |         |
|------------------|---------|
| Estimated, $K_a$ | 0.11790 |
|------------------|---------|

|                       |         |
|-----------------------|---------|
| Final Selected, $K_f$ | 0.11790 |
|-----------------------|---------|

|                                                       |                              |
|-------------------------------------------------------|------------------------------|
| Calculated Mass Dry Soil for Final Saturation = 100%: | using measured/assumed $G_s$ |
|-------------------------------------------------------|------------------------------|

|                      |   |              |  |              |
|----------------------|---|--------------|--|--------------|
| and final height by: | X | Measurement; |  | Dial Change. |
|----------------------|---|--------------|--|--------------|

Back Cal. Mass Dry Soil, (g) = 103.22

Avg. Back Calculated and Measured Mass Dry Soil (g) = 103.27

### Summary of Specimen Physical Properties

|                                   |                                  |               |                             |                                     |                                                                |                                    |                                                                        |                         |
|-----------------------------------|----------------------------------|---------------|-----------------------------|-------------------------------------|----------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------|-------------------------|
| Specific Gravity<br>$G_s = 2.720$ |                                  | X             | Assumed                     |                                     | To make $S_f = 100\%$ at end of test.                          |                                    |                                                                        |                         |
|                                   |                                  | X             | Measured                    |                                     | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_f = 100\%$ |                                    |                                                                        |                         |
| Mass Dry Soil, (g)                | Initial: 103.33<br>Final (4): NA | X             | From Cal. Routine No.       | 5                                   | Note: Routine #5 is based on final measurements.               |                                    |                                                                        |                         |
|                                   |                                  |               | Make $S_f = 100\%$ , or;    |                                     | Avg. of measured & make $S_f = 100\%$                          |                                    |                                                                        |                         |
| Initial Height (mm) =             |                                  |               | 18.83                       | X                                   | Measured ;                                                     |                                    | Back Calculated                                                        | Back-cal. Sat. (%) = NA |
| Final Height (mm) =               |                                  |               | 18.81                       | X                                   | Measured ;                                                     |                                    | Initial $H_o$ & dial change during loading                             |                         |
|                                   | Water Content, w (%)             | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                              | Height of Solids, $H_s$ (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) : |                         |
| Initial                           | 18.6                             | 0.545         | 92.7                        | 130.1                               | 109.7                                                          | 12.183                             | From                                                                   | To (ksf)                |
| Final                             | 19.9                             | 0.544         | 99.7                        | 131.7                               | 109.8                                                          | NA                                 | NA                                                                     | NA                      |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\varepsilon_a$ (%)               | CR    | RR    | OCR | Liquid Limit (LL)     | 61 | Minus 200 (%) |
| Casagrande Method      | 30.00             | NA                                | 0.126 | 0.053 | 9.0 | Plastic Limit (PL)    | 16 | 80.3          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 45 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF      Reviewed By: HP 

Date: 4/7/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-1 File Name: B-2319\_UD4a  
 Task No.: NA Date: Start: 3/28/2008 Initial Height,  $H_o$  (mm): 18.83  
 Project Name: Exelon (Victoria) Completed: 4/6/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.2385  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b,BE}$  (psi): 70.57482, V: 0.02283611 Piston Uplift,  $P_{up}$  (lbf): 34.63  
 Back Pressure,  $U_{b,CS}$  (psi): 70.49868, V: 0.02281144 Setup  $DT_{ref}$  (V): 0.04464874  
 Displacement Transducer No.: DT-101 Calib. Factor (mm/V): -213.274 Ch. No.: 1  
 Pore Press. Transducer No.: PT-107 Calib. Factor (psi/V): 3086.313 Ref. Zero (V): -0.000031 Ch. No.: 2  
 Force Cell No.: FT-099 Calib. Factor (lbf/V): 161209.607 Ref. Zero (V): 0.000119 Ch. No.: 3

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP HP

**Remarks:**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| S                            | 88                    | 15 : 02 : 00         |                                                                    | 0.31                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                 |
| BS                           | 88                    | 15 : 22 : 00         |                                                                    | 1.50                                                        |                                                            | 0.047                                                         | 0.030                                                                 | 0.017                                                                   |                                                                                 |
| BE                           | 89                    | 16 : 51 : 00         |                                                                    | 3.06                                                        | 0.011                                                      | -0.006                                                        | 0.054                                                                 | -0.060                                                                  |                                                                                 |
| CS                           | 89                    | 16 : 52 : 00         | 0                                                                  | 3.07                                                        | 0.000                                                      | -0.006                                                        | 0.054                                                                 | -0.060                                                                  |                                                                                 |
|                              | 89                    | 17 : 28 : 00         | 36                                                                 | 6.03                                                        | 1.993                                                      | 0.042                                                         | 0.087                                                                 | -0.045                                                                  | 0.137                                                                           |
|                              | 89                    | 18 : 04 : 00         | 72                                                                 | 8.09                                                        | 3.229                                                      | 0.095                                                         | 0.104                                                                 | -0.009                                                                  | 0.315                                                                           |
|                              | 89                    | 19 : 00 : 00         | 128                                                                | 10.64                                                       | 4.671                                                      | 0.166                                                         | 0.120                                                                 | 0.045                                                                   | 0.310                                                                           |
|                              | 89                    | 20 : 12 : 00         | 200                                                                | 13.88                                                       | 6.432                                                      | 0.254                                                         | 0.137                                                                 | 0.118                                                                   | 0.320                                                                           |
|                              | 89                    | 21 : 24 : 00         | 272                                                                | 17.26                                                       | 8.126                                                      | 0.344                                                         | 0.151                                                                 | 0.194                                                                   | 0.336                                                                           |
|                              | 89                    | 22 : 36 : 00         | 344                                                                | 20.96                                                       | 9.922                                                      | 0.434                                                         | 0.164                                                                 | 0.270                                                                   | 0.338                                                                           |
|                              | 89                    | 23 : 48 : 00         | 416                                                                | 24.83                                                       | 11.627                                                     | 0.523                                                         | 0.176                                                                 | 0.347                                                                   | 0.339                                                                           |
|                              | 90                    | 01 : 00 : 00         | 488                                                                | 28.98                                                       | 13.397                                                     | 0.609                                                         | 0.188                                                                 | 0.421                                                                   | 0.331                                                                           |
|                              | 90                    | 02 : 12 : 00         | 560                                                                | 33.21                                                       | 15.062                                                     | 0.693                                                         | 0.200                                                                 | 0.493                                                                   | 0.318                                                                           |
| US                           | 90                    | 03 : 24 : 00         | 632                                                                | 37.34                                                       | 16.503                                                     | 0.773                                                         | 0.210                                                                 | 0.563                                                                   | 0.309                                                                           |
|                              | 90                    | 04 : 36 : 00         | 704                                                                | 42.17                                                       | 18.564                                                     | 0.856                                                         | 0.222                                                                 | 0.634                                                                   | 0.313                                                                           |
|                              | 90                    | 05 : 48 : 00         | 776                                                                | 47.01                                                       | 20.575                                                     | 0.938                                                         | 0.234                                                                 | 0.704                                                                   | 0.310                                                                           |
|                              | 90                    | 07 : 00 : 00         | 848                                                                | 52.43                                                       | 23.112                                                     | 1.022                                                         | 0.247                                                                 | 0.775                                                                   | 0.316                                                                           |
|                              | 90                    | 08 : 12 : 00         | 920                                                                | 57.42                                                       | 25.188                                                     | 1.104                                                         | 0.259                                                                 | 0.845                                                                   | 0.310                                                                           |
|                              | 90                    | 09 : 24 : 00         | 992                                                                | 62.88                                                       | 27.718                                                     | 1.189                                                         | 0.272                                                                 | 0.916                                                                   | 0.316                                                                           |
|                              | 90                    | 10 : 36 : 00         | 1064                                                               | 67.97                                                       | 29.801                                                     | 1.270                                                         | 0.284                                                                 | 0.986                                                                   | 0.308                                                                           |
|                              | 90                    | 11 : 48 : 00         | 1136                                                               | 73.28                                                       | 32.019                                                     | 1.351                                                         | 0.297                                                                 | 1.054                                                                   | 0.301                                                                           |
| UE                           | 90                    | 13 : 00 : 00         | 1208                                                               | 78.99                                                       | 34.664                                                     | 1.435                                                         | 0.311                                                                 | 1.124                                                                   | 0.311                                                                           |
|                              | 90                    | 14 : 12 : 00         | 1280                                                               | 83.77                                                       | 36.179                                                     | 1.511                                                         | 0.322                                                                 | 1.189                                                                   | 0.288                                                                           |
|                              | 90                    | 15 : 22 : 00         | 1350                                                               | 89.22                                                       | 38.523                                                     | 1.589                                                         | 0.335                                                                 | 1.254                                                                   | 0.293                                                                           |



**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 90                    | 15 : 24 : 00         | 1352                                                               | 89.01                                                       | 38.348                                                     | 1.590                                                         | 0.335                                                                 | 1.256                                                                   | 0.299                                                                        |
|                              | 90                    | 22 : 48 : 00         | 1796                                                               | 68.13                                                       | 6.381                                                      | 1.654                                                         | 0.292                                                                 | 1.362                                                                   | 0.077                                                                        |
|                              | 91                    | 06 : 12 : 00         | 2240                                                               | 64.90                                                       | 1.867                                                      | 1.665                                                         | 0.284                                                                 | 1.380                                                                   | 0.013                                                                        |
|                              | 91                    | 13 : 36 : 00         | 2684                                                               | 64.10                                                       | 1.190                                                      | 1.669                                                         | 0.283                                                                 | 1.387                                                                   | 0.005                                                                        |
|                              | 91                    | 21 : 00 : 00         | 3128                                                               | 63.57                                                       | 0.397                                                      | 1.671                                                         | 0.281                                                                 | 1.389                                                                   | 0.002                                                                        |
| US                           | 92                    | 15 : 46 : 00         | 4254                                                               | 62.14                                                       | -0.970                                                     | 1.668                                                         | 0.278                                                                 | 1.390                                                                   | 0.000                                                                        |
|                              | 92                    | 23 : 10 : 00         | 4698                                                               | 32.14                                                       | -8.660                                                     | 1.512                                                         | 0.198                                                                 | 1.314                                                                   | -0.055                                                                       |
|                              | 93                    | 06 : 34 : 00         | 5142                                                               | 13.58                                                       | -10.804                                                    | 1.264                                                         | 0.129                                                                 | 1.134                                                                   | -0.129                                                                       |
|                              | 93                    | 13 : 58 : 00         | 5586                                                               | 4.70                                                        | -10.991                                                    | 0.977                                                         | 0.081                                                                 | 0.896                                                                   | -0.171                                                                       |
| UE                           | 93                    | 21 : 22 : 00         | 6030                                                               | 1.02                                                        | -10.707                                                    | 0.687                                                         | 0.043                                                                 | 0.645                                                                   | -0.181                                                                       |
|                              | 94                    | 04 : 46 : 00         | 6474                                                               | 0.15                                                        | -9.856                                                     | 0.379                                                         | 0.012                                                                 | 0.366                                                                   | -0.200                                                                       |
|                              | 94                    | 04 : 50 : 00         | 6478                                                               | 0.14                                                        | -9.841                                                     | 0.376                                                         | 0.012                                                                 | 0.364                                                                   | -0.206                                                                       |
|                              | 94                    | 06 : 30 : 00         | 6578                                                               | 2.16                                                        | -9.159                                                     | 0.506                                                         | 0.059                                                                 | 0.447                                                                   | 0.267                                                                        |
|                              | 94                    | 08 : 28 : 00         | 6696                                                               | 6.93                                                        | -5.823                                                     | 0.646                                                         | 0.095                                                                 | 0.550                                                                   | 0.278                                                                        |
|                              | 94                    | 12 : 04 : 00         | 6912                                                               | 21.15                                                       | 10.294                                                     | 0.801                                                         | 0.161                                                                 | 0.640                                                                   | 0.133                                                                        |
| US                           | 94                    | 13 : 54 : 00         | 7022                                                               | 29.52                                                       | 17.061                                                     | 0.947                                                         | 0.190                                                                 | 0.758                                                                   | 0.339                                                                        |
|                              | 94                    | 15 : 40 : 00         | 7128                                                               | 38.18                                                       | 23.194                                                     | 1.061                                                         | 0.216                                                                 | 0.845                                                                   | 0.263                                                                        |
|                              | 94                    | 17 : 28 : 00         | 7236                                                               | 46.98                                                       | 28.512                                                     | 1.179                                                         | 0.241                                                                 | 0.938                                                                   | 0.275                                                                        |
|                              | 94                    | 19 : 16 : 00         | 7344                                                               | 56.16                                                       | 33.392                                                     | 1.297                                                         | 0.264                                                                 | 1.033                                                                   | 0.281                                                                        |
|                              | 94                    | 21 : 04 : 00         | 7452                                                               | 65.68                                                       | 37.573                                                     | 1.413                                                         | 0.286                                                                 | 1.127                                                                   | 0.277                                                                        |
|                              | 94                    | 22 : 52 : 00         | 7560                                                               | 75.19                                                       | 40.687                                                     | 1.531                                                         | 0.307                                                                 | 1.224                                                                   | 0.286                                                                        |
|                              | 95                    | 00 : 40 : 00         | 7668                                                               | 84.52                                                       | 39.476                                                     | 1.652                                                         | 0.326                                                                 | 1.326                                                                   | 0.302                                                                        |
|                              | 95                    | 02 : 28 : 00         | 7776                                                               | 93.29                                                       | 38.483                                                     | 1.769                                                         | 0.345                                                                 | 1.424                                                                   | 0.290                                                                        |
|                              | 95                    | 04 : 16 : 00         | 7884                                                               | 103.25                                                      | 39.538                                                     | 1.889                                                         | 0.369                                                                 | 1.520                                                                   | 0.281                                                                        |
|                              | 95                    | 06 : 04 : 00         | 7992                                                               | 112.62                                                      | 40.371                                                     | 2.002                                                         | 0.392                                                                 | 1.610                                                                   | 0.267                                                                        |
|                              | 95                    | 07 : 52 : 00         | 8100                                                               | 122.94                                                      | 42.466                                                     | 2.118                                                         | 0.417                                                                 | 1.701                                                                   | 0.268                                                                        |
|                              | 95                    | 09 : 40 : 00         | 8208                                                               | 132.65                                                      | 40.580                                                     | 2.238                                                         | 0.441                                                                 | 1.797                                                                   | 0.284                                                                        |
|                              | 95                    | 11 : 28 : 00         | 8316                                                               | 142.35                                                      | 41.520                                                     | 2.353                                                         | 0.464                                                                 | 1.889                                                                   | 0.269                                                                        |
|                              | 95                    | 13 : 16 : 00         | 8424                                                               | 153.07                                                      | 41.688                                                     | 2.470                                                         | 0.491                                                                 | 1.980                                                                   | 0.268                                                                        |
|                              | 95                    | 15 : 04 : 00         | 8532                                                               | 163.35                                                      | 41.487                                                     | 2.581                                                         | 0.516                                                                 | 2.065                                                                   | 0.252                                                                        |
|                              | 95                    | 16 : 52 : 00         | 8640                                                               | 175.49                                                      | 41.258                                                     | 2.697                                                         | 0.546                                                                 | 2.151                                                                   | 0.253                                                                        |
|                              | 95                    | 17 : 00 : 00         | 8648                                                               | 176.25                                                      | 41.041                                                     | 2.704                                                         | 0.548                                                                 | 2.156                                                                   | 0.224                                                                        |
| UE                           | 95                    | 19 : 56 : 00         | 8824                                                               | 163.22                                                      | 29.035                                                     | 2.740                                                         | 0.530                                                                 | 2.210                                                                   | 0.098                                                                        |
|                              | 96                    | 00 : 58 : 00         | 9126                                                               | 94.27                                                       | -8.062                                                     | 2.580                                                         | 0.419                                                                 | 2.162                                                                   | -0.051                                                                       |
|                              | 96                    | 04 : 56 : 00         | 9364                                                               | 55.21                                                       | -10.762                                                    | 2.390                                                         | 0.335                                                                 | 2.055                                                                   | -0.143                                                                       |
|                              | 96                    | 08 : 54 : 00         | 9602                                                               | 30.35                                                       | -11.415                                                    | 2.174                                                         | 0.266                                                                 | 1.908                                                                   | -0.197                                                                       |
| US                           | 96                    | 12 : 52 : 00         | 9840                                                               | 15.75                                                       | -11.404                                                    | 1.911                                                         | 0.213                                                                 | 1.698                                                                   | -0.281                                                                       |
|                              | 96                    | 16 : 50 : 00         | 10078                                                              | 6.87                                                        | -11.397                                                    | 1.633                                                         | 0.169                                                                 | 1.465                                                                   | -0.312                                                                       |
|                              | 96                    | 20 : 48 : 00         | 10316                                                              | 2.09                                                        | -11.415                                                    | 1.353                                                         | 0.132                                                                 | 1.221                                                                   | -0.326                                                                       |
| UE                           | 97                    | 00 : 46 : 00         | 10554                                                              | 0.30                                                        | -11.411                                                    | 1.065                                                         | 0.132                                                                 | 0.934                                                                   | -0.385                                                                       |
|                              | 97                    | 04 : 44 : 00         | 10792                                                              | 0.06                                                        | -11.370                                                    | 0.754                                                         | 0.132                                                                 | 0.622                                                                   | -0.417                                                                       |
|                              |                       | : :                  |                                                                    |                                                             |                                                            |                                                               |                                                                       |                                                                         |                                                                              |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-1 ☒ Undisturbed or; ☐ Reconstituted - Specimen. File Name: B-2319\_UD4

Task No.: NA Date: Start: 3/28/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.5 Piston Uplift,  $P_{up}$  (lb): 34.63

Project Name: Exelon (Victoria) Completed: 4/6/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Light Yellowish Brown Fat CLAY with sand (CH)

Ring No.: 1 Area,  $A_r$  (cm<sup>2</sup>): 31.239 Solids Ht.,  $H_s$  (mm): 12.183 Specific Gravity,  $G_s = 2.720$  ☒ Meas.; ☐ Assumed

**Initial:** Height  $H_o$ : 18.83 Water 18.6 Void 0.545 Deg. of 92.7 Total Unit 130.1 Dry Unit 109.7

**Final:** (mm):  $H_f$ : 18.81 Content,  $w$  (%): 19.9 Ratio,  $e$ : 0.544 Sat.,  $S$  (%): 99.7 Weight,  $\gamma_t$  (pcf): 131.7 Weight,  $\gamma_d$  (pcf): 109.8

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF Reviewed By: HP HP

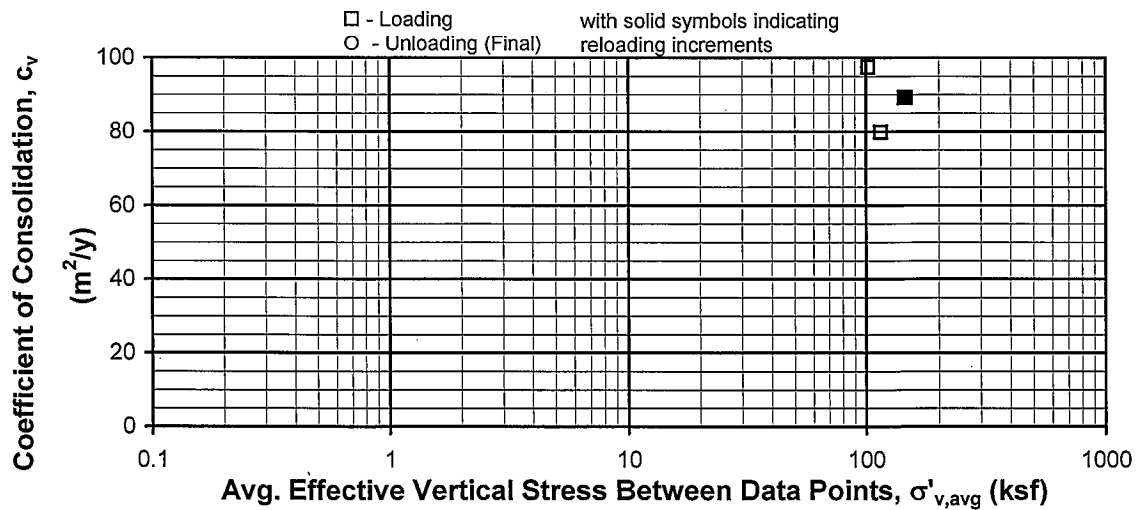
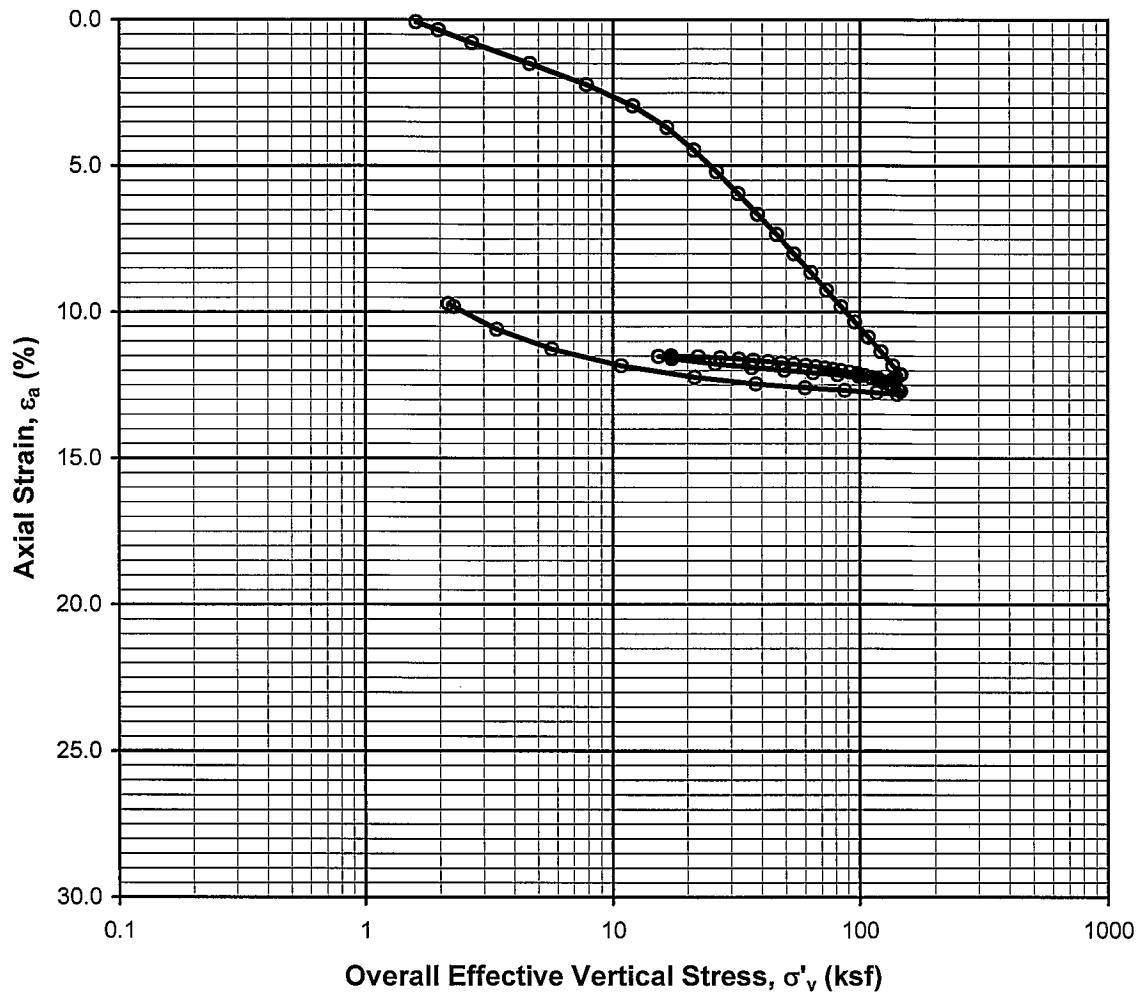
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n} (\epsilon_{ac,n})$<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n (2)$<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                   |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
| S                            |                                                                          |                                                                         |                                                                                                                   |                                    | 0.31                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
| BS                           |                                                                          |                                                                         | 0.09                                                                                                              | 0.544                              | 1.50                                                    |                                                                |                                                                                         | 18.811                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
| BE                           |                                                                          | 3.05                                                                    | -0.32                                                                                                             | 0.550                              | 3.06                                                    | 0.011                                                          | 0.4                                                                                     | 18.888                                                |                                                                           |                                                                     | 0.547                                  |                                                   |                                                                                                |                                                                                                        |
| CS                           | 0                                                                        | 3.07                                                                    | -0.32                                                                                                             | 0.550                              | 3.07                                                    | 0.000                                                          | 0.0                                                                                     | 18.888                                                |                                                                           |                                                                     | 0.550                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 36                                                                       | 4.62                                                                    | -0.24                                                                                                             | 0.549                              | 6.03                                                    | 1.993                                                          | 33.0                                                                                    | 18.873                                                | 3.84                                                                      |                                                                     | 0.550                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 72                                                                       | 5.76                                                                    | -0.05                                                                                                             | 0.546                              | 8.09                                                    | 3.229                                                          | 39.9                                                                                    | 18.837                                                | 5.19                                                                      |                                                                     | 0.548                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 128                                                                      | 7.24                                                                    | 0.24                                                                                                              | 0.542                              | 10.64                                                   | 4.671                                                          | 43.9                                                                                    | 18.783                                                | 6.50                                                                      |                                                                     | 0.544                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 200                                                                      | 9.17                                                                    | 0.62                                                                                                              | 0.536                              | 13.88                                                   | 6.432                                                          | 46.3                                                                                    | 18.710                                                | 8.20                                                                      |                                                                     | 0.539                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 272                                                                      | 11.29                                                                   | 1.03                                                                                                              | 0.530                              | 17.26                                                   | 8.126                                                          | 47.1                                                                                    | 18.634                                                | 10.23                                                                     |                                                                     | 0.533                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 344                                                                      | 13.67                                                                   | 1.43                                                                                                              | 0.523                              | 20.96                                                   | 9.922                                                          | 47.3                                                                                    | 18.558                                                | 12.48                                                                     |                                                                     | 0.526                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 416                                                                      | 16.30                                                                   | 1.84                                                                                                              | 0.517                              | 24.83                                                   | 11.627                                                         | 46.8                                                                                    | 18.481                                                | 14.98                                                                     |                                                                     | 0.520                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 488                                                                      | 19.17                                                                   | 2.24                                                                                                              | 0.511                              | 28.98                                                   | 13.397                                                         | 46.2                                                                                    | 18.407                                                | 17.73                                                                     |                                                                     | 0.514                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 560                                                                      | 22.20                                                                   | 2.62                                                                                                              | 0.505                              | 33.21                                                   | 15.062                                                         | 45.4                                                                                    | 18.335                                                | 20.68                                                                     |                                                                     | 0.508                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 632                                                                      | 25.31                                                                   | 2.99                                                                                                              | 0.499                              | 37.34                                                   | 16.503                                                         | 44.2                                                                                    | 18.265                                                | 23.75                                                                     |                                                                     | 0.502                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 704                                                                      | 28.64                                                                   | 3.37                                                                                                              | 0.493                              | 42.17                                                   | 18.564                                                         | 44.0                                                                                    | 18.194                                                | 26.98                                                                     |                                                                     | 0.496                                  |                                                   | 0.21                                                                                           |                                                                                                        |
|                              | 776                                                                      | 32.03                                                                   | 3.74                                                                                                              | 0.488                              | 47.01                                                   | 20.575                                                         | 43.8                                                                                    | 18.124                                                | 30.33                                                                     |                                                                     | 0.491                                  |                                                   | 0.38                                                                                           |                                                                                                        |
|                              | 848                                                                      | 35.59                                                                   | 4.12                                                                                                              | 0.482                              | 52.43                                                   | 23.112                                                         | 44.1                                                                                    | 18.053                                                | 33.81                                                                     |                                                                     | 0.485                                  |                                                   | 0.57                                                                                           |                                                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 920                                                                      | 39.07                                                                   | 4.49                                                                                                                  | 0.476                              | 57.42                                                   | 25.188                                                         | 43.9                                                                                    | 17.983                                                | 37.33                                                                     |                                                                     | 0.479                                  |                                                   | 0.63                                                                                           |                                                                                                        |
|                              | 992                                                                      | 42.68                                                                   | 4.87                                                                                                                  | 0.470                              | 62.88                                                   | 27.718                                                         | 44.1                                                                                    | 17.912                                                | 40.87                                                                     |                                                                     | 0.473                                  |                                                   | 0.78                                                                                           |                                                                                                        |
|                              | 1064                                                                     | 46.26                                                                   | 5.24                                                                                                                  | 0.465                              | 67.97                                                   | 29.801                                                         | 43.8                                                                                    | 17.842                                                | 44.47                                                                     |                                                                     | 0.467                                  |                                                   | 0.81                                                                                           |                                                                                                        |
|                              | 1136                                                                     | 49.97                                                                   | 5.60                                                                                                                  | 0.459                              | 73.28                                                   | 32.019                                                         | 43.7                                                                                    | 17.774                                                | 48.11                                                                     |                                                                     | 0.462                                  |                                                   | 0.92                                                                                           |                                                                                                        |
| UE                           | 1208                                                                     | 53.74                                                                   | 5.97                                                                                                                  | 0.453                              | 78.99                                                   | 34.664                                                         | 43.9                                                                                    | 17.704                                                | 51.85                                                                     | 0.15                                                                | 0.456                                  | 2.93E-05                                          | 1.04                                                                                           |                                                                                                        |
|                              | 1280                                                                     | 57.46                                                                   | 6.32                                                                                                                  | 0.448                              | 83.77                                                   | 36.179                                                         | 43.2                                                                                    | 17.639                                                | 55.60                                                                     |                                                                     | 0.451                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1350                                                                     | 61.20                                                                   | 6.66                                                                                                                  | 0.443                              | 89.22                                                   | 38.523                                                         | 43.2                                                                                    | 17.574                                                | 59.33                                                                     |                                                                     | 0.445                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1352                                                                     | 61.13                                                                   | 6.67                                                                                                                  | 0.442                              | 89.01                                                   | 38.348                                                         | 43.1                                                                                    | 17.572                                                | 61.17                                                                     |                                                                     | 0.443                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1796                                                                     | 63.81                                                                   | 7.24                                                                                                                  | 0.434                              | 68.13                                                   | 6.381                                                          | 9.4                                                                                     | 17.466                                                | 62.47                                                                     |                                                                     | 0.438                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2240                                                                     | 63.65                                                                   | 7.33                                                                                                                  | 0.432                              | 64.90                                                   | 1.867                                                          | 2.9                                                                                     | 17.448                                                | 63.73                                                                     |                                                                     | 0.433                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2684                                                                     | 63.30                                                                   | 7.37                                                                                                                  | 0.432                              | 64.10                                                   | 1.190                                                          | 1.9                                                                                     | 17.441                                                | 63.47                                                                     |                                                                     | 0.432                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3128                                                                     | 63.30                                                                   | 7.38                                                                                                                  | 0.431                              | 63.57                                                   | 0.397                                                          | 0.6                                                                                     | 17.439                                                | 63.30                                                                     |                                                                     | 0.432                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 4254                                                                     | 62.79                                                                   | 7.38                                                                                                                  | 0.431                              | 62.14                                                   | -0.970                                                         | -1.6                                                                                    | 17.438                                                | 63.05                                                                     |                                                                     | 0.431                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 4698                                                                     | 37.68                                                                   | 6.98                                                                                                                  | 0.438                              | 32.14                                                   | -8.660                                                         | -26.9                                                                                   | 17.514                                                | 50.24                                                                     | 1.23                                                                | 0.434                                  | 3.05E-05                                          | 6.78                                                                                           |                                                                                                        |
|                              | 5142                                                                     | 20.06                                                                   | 6.02                                                                                                                  | 0.452                              | 13.58                                                   | -10.804                                                        | -79.6                                                                                   | 17.694                                                | 28.87                                                                     | 0.45                                                                | 0.445                                  | 3.49E-05                                          | 4.86                                                                                           |                                                                                                        |
|                              | 5586                                                                     | 10.50                                                                   | 4.76                                                                                                                  | 0.472                              | 4.70                                                    | -10.991                                                        | -233.8                                                                                  | 17.932                                                | 15.28                                                                     | 0.25                                                                | 0.462                                  | 4.04E-05                                          | 4.05                                                                                           |                                                                                                        |
| UE                           | 6030                                                                     | 5.19                                                                    | 3.42                                                                                                                  | 0.493                              | 1.02                                                    | -10.707                                                        | -1051.9                                                                                 | 18.183                                                | 7.85                                                                      | 0.19                                                                | 0.482                                  | 4.28E-05                                          | 3.91                                                                                           |                                                                                                        |
|                              | 6474                                                                     | 2.45                                                                    | 1.95                                                                                                                  | 0.515                              | 0.15                                                    | -9.856                                                         | -6732.8                                                                                 | 18.462                                                | 3.82                                                                      |                                                                     | 0.504                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6478                                                                     | 2.42                                                                    | 1.93                                                                                                                  | 0.516                              | 0.14                                                    | -9.841                                                         | -6881.7                                                                                 | 18.464                                                | 2.44                                                                      |                                                                     | 0.516                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6578                                                                     | 6.51                                                                    | 2.38                                                                                                                  | 0.509                              | 2.16                                                    | -9.159                                                         | -424.5                                                                                  | 18.381                                                | 4.47                                                                      |                                                                     | 0.512                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6696                                                                     | 10.40                                                                   | 2.92                                                                                                                  | 0.500                              | 6.93                                                    | -5.823                                                         | -84.1                                                                                   | 18.278                                                | 8.46                                                                      |                                                                     | 0.505                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 6912                                                                     | 13.56                                                                   | 3.40                                                                                                                  | 0.493                              | 21.15                                                   | 10.294                                                         | 48.7                                                                                    | 18.188                                                | 11.98                                                                     |                                                                     | 0.497                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 7022                                                                     | 16.61                                                                   | 4.02                                                                                                                  | 0.483                              | 29.52                                                   | 17.061                                                         | 57.8                                                                                    | 18.070                                                | 15.08                                                                     |                                                                     | 0.488                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 7128                                                                     | 20.47                                                                   | 4.49                                                                                                                  | 0.476                              | 38.18                                                   | 23.194                                                         | 60.7                                                                                    | 17.983                                                | 18.54                                                                     |                                                                     | 0.480                                  |                                                   | 0.28                                                                                           |                                                                                                        |
|                              | 7236                                                                     | 25.21                                                                   | 4.98                                                                                                                  | 0.468                              | 46.98                                                   | 28.512                                                         | 60.7                                                                                    | 17.890                                                | 22.84                                                                     |                                                                     | 0.472                                  |                                                   | 0.44                                                                                           |                                                                                                        |
|                              | 7344                                                                     | 30.76                                                                   | 5.49                                                                                                                  | 0.461                              | 56.16                                                   | 33.392                                                         | 59.5                                                                                    | 17.795                                                | 27.99                                                                     |                                                                     | 0.465                                  |                                                   | 0.58                                                                                           |                                                                                                        |
|                              | 7452                                                                     | 37.29                                                                   | 5.99                                                                                                                  | 0.453                              | 65.68                                                   | 37.573                                                         | 57.2                                                                                    | 17.701                                                | 34.03                                                                     |                                                                     | 0.457                                  |                                                   | 0.71                                                                                           |                                                                                                        |
|                              | 7560                                                                     | 44.73                                                                   | 6.50                                                                                                                  | 0.445                              | 75.19                                                   | 40.687                                                         | 54.1                                                                                    | 17.604                                                | 41.01                                                                     |                                                                     | 0.449                                  |                                                   | 0.83                                                                                           |                                                                                                        |
|                              | 7668                                                                     | 55.56                                                                   | 7.04                                                                                                                  | 0.437                              | 84.52                                                   | 39.476                                                         | 46.7                                                                                    | 17.502                                                | 50.15                                                                     | 0.13                                                                | 0.441                                  | 2.38E-05                                          | 1.00                                                                                           |                                                                                                        |
|                              | 7776                                                                     | 65.43                                                                   | 7.56                                                                                                                  | 0.429                              | 93.29                                                   | 38.483                                                         | 41.3                                                                                    | 17.404                                                | 60.50                                                                     | 0.13                                                                | 0.433                                  | 2.26E-05                                          | 1.19                                                                                           |                                                                                                        |

## DCN# EXE812

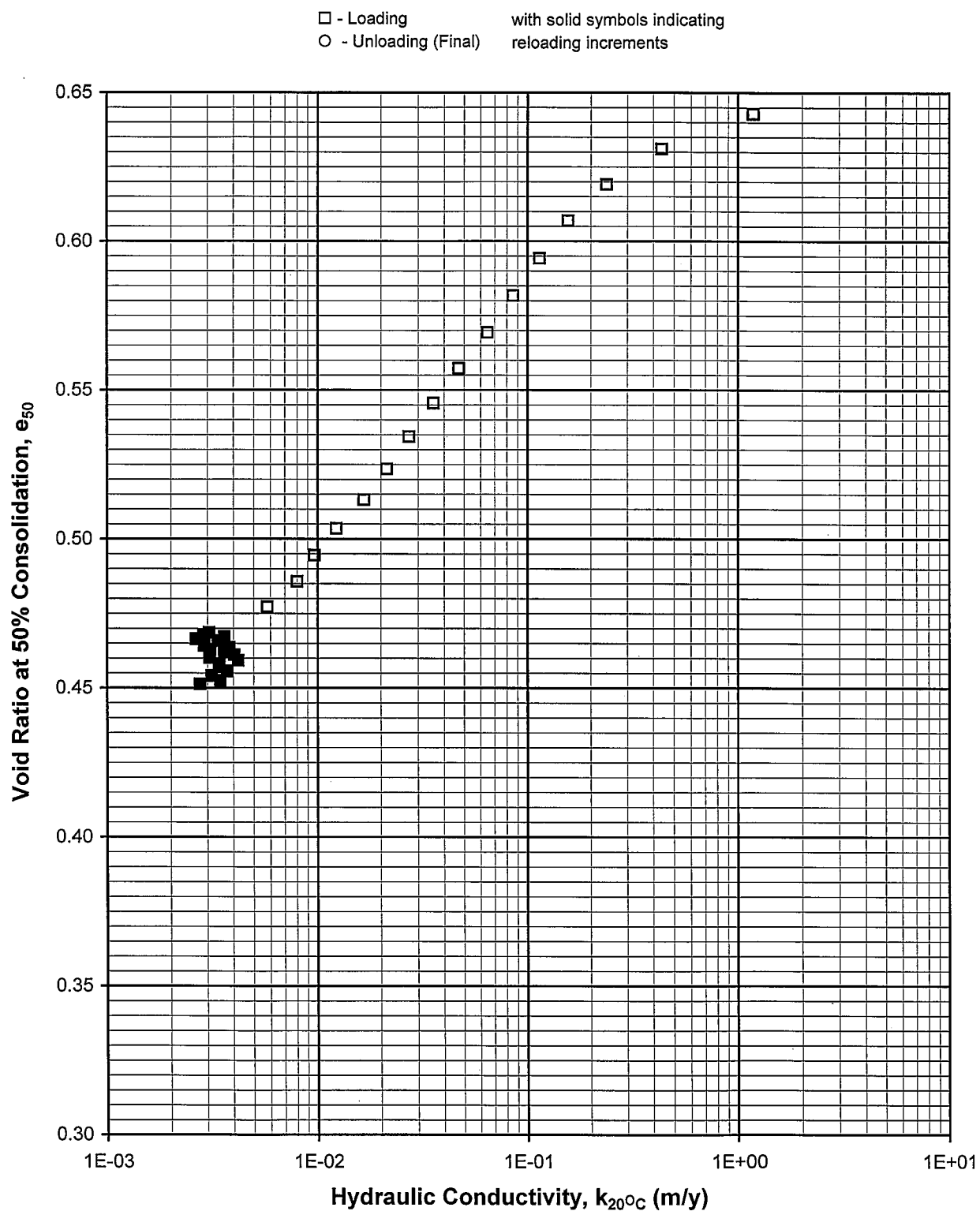
**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-7A - Depth 65.0 - 67.0 ft  
 Boring B-2319UD

KAW 7/16/08

Reviewed By: HP



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-7A - Depth 65.0 - 67.0 ft  
 Boring B-2319UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-1 File Name: B-2319\_UD7a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.660 ☒ Meas.; ☐ Assumed Ring No.: 1  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.739  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                                          |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2319UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                                       | No. Layers =            |
| Sample No.: UD-7                                   | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =                                      | Drop (in.) =            |
| Depth (ft): 65.0 - 67.0                            | Specimen No.: A                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: $U_{nl}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                 |                                                          | Initial - Trimming Location |                                   |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|------------------------------------|----------------------------------------------------------|-----------------------------|-----------------------------------|------------|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                    |                                                          | Top (W1)                    | Bottom (W2)                       | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 326.33  | 326.21 |
| Container No.                      |                                                          | 160                         | 1109                              | 2043       | 170                                   | Mass Ring (g)                                              | 208.34  |        |
| Mass Moist Soil + Container (g)    |                                                          | 110.08                      | 114.72                            | 120.05     | 62.56                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 117.99  | 117.87 |
| Mass Dry Soil + Container (g)      |                                                          | 97.16                       | 101.81                            | 106.04     | 57.50                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                 |                                                          | 30.55                       | 31.81                             | 30.69      | 30.02                                 | Container No.                                              |         | 5057   |
| WATER CONTENT (%)                  |                                                          | 19.40                       | 18.44                             | 18.59      | 18.41                                 | Mass Dry Soil + Container (g)                              |         | 30.56  |
| Avg. Initial Water Content, W4 (%) |                                                          | 18.81                       | Final W <sub>at</sub> : X Slice ; |            | Whole Spec.                           | Mass Container (g)                                         |         | 30.54  |
|                                    | See attached data sheet(s) for additional water contents |                             |                                   |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 0.02   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                                                       |                                                                       |                                                                       | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                                                       | Final                                                                 |                                                                       | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.070 |
| with Spec.                                                                                                                                                                   | without Spec.                                                         | with Spec.                                                            | without Spec.                                                         | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 18.950                                                                                                                                                                       | 0.000                                                                 | 12.100                                                                | 13.540                                                                | Avg. Reading on Soil, $d_{soil}$                        |  | 18.922                                                              | 12.016 |
| 18.970                                                                                                                                                                       | 0.000                                                                 | 11.860                                                                | 13.470                                                                | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.480 |
| 18.920                                                                                                                                                                       | 0.000                                                                 | 12.070                                                                | 13.510                                                                | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 18.922                                                              | 17.606 |
| 18.890                                                                                                                                                                       | 0.000                                                                 | 12.130                                                                | 13.470                                                                | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 18.880                                                                                                                                                                       | 0.000                                                                 | 11.920                                                                | 13.410                                                                | Initial Height, $H_o$                                   |  | 18.922                                                              |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                                                       |                                                                       |                                                                       |                                                         |  | Final Soil Height Measurement, $H_{f,m}$                            |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                                                       |                                                                       |                                                                       |                                                         |  | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               |        |
|                                                                                                                                                                              |                                                                       |                                                                       |                                                                       |                                                         |  | 0.68                                                                |        |

| Estimated Initial Unit Weight                                                                         |                                    | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 122.65                                                                  | Dry, $\gamma_{d,o}$ (pcf) = 103.23 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |                                    | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Yellowish Brown Sandy Lean CLAY (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: JTG Take Down By: JTG  
 Date: 3/24/2008 Date: 3/25/2008 Final Calc. By: LF Date: 3/28/2008  
 Reviewed By: HP HP

Note: NA - Not Applicable

KAW 7/16/08



## ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686      Test Station No.: CRS-1      File Name: B-2319\_UD7a  
Task No.: NA      Specific Gravity,  $G_s$ : 2.660      ☒ Measured ; ☐ Assumed.  
Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |       |                      |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-------|----------------------|
|                  |                       |                          |                          | Height<br>Initial            | Meas. | Final Height<br>Dial |
| 1                | Initial, Top, W1      | 19.40                    | 98.82                    | 84.1                         | 102.3 | 100.1                |
| 2                | " Bottom, W2          | 18.44                    | 99.62                    | 81.7                         | 99.6  | 97.4                 |
| 3                | " Sides, W3           | 18.59                    | 99.49                    | 82.1                         | 100.0 | 97.9                 |
| 4                | " Average, W4         | 18.81                    | 99.31                    | 82.6                         | 100.6 | 98.5                 |
| 5                | " Back Calculated (1) | 18.51                    | 99.56 (3)                | 81.8                         | 99.8  | 97.6                 |
| 6                | Final                 | 18.41                    | 99.56 (2)                | 81.8                         | 99.8  | 97.6                 |

**Calculated Specific Gravity for Final Saturation = 100%:**

Used Cal. Routine No.  to obtain the mass of dry soil  
and final height by: ☒ Measurement; ☐ Dial Change.

Back Cal.  $G_s = 2.657$ 

Avg.  $G_s$  (measured/assumed) & Back Cal.  $G_s$  = 2.659

Calculation Constant, K

$$= (\text{unit conversion}) / G_s \times \rho_w \times A_r$$

|                  |         |
|------------------|---------|
| Estimated, $K_e$ | 0.11866 |
|------------------|---------|

|                       |         |
|-----------------------|---------|
| Final Selected, $K_f$ | 0.11866 |
|-----------------------|---------|

**Calculated Mass Dry Soil for Final Saturation = 100%:**

using measured/assumed  $G_s$ 

|                      |   |              |  |              |
|----------------------|---|--------------|--|--------------|
| and final height by: | X | Measurement; |  | Dial Change. |
|----------------------|---|--------------|--|--------------|

Back Cal. Mass Dry Soil, (g) = 99.50

Avg. Back Calculated and Measured Mass Dry Soil (q) = 99.53

| Summary of Specimen Physical Properties |                      |               |                             |                                     |                                                                |                                    |                                                                        |          |  |
|-----------------------------------------|----------------------|---------------|-----------------------------|-------------------------------------|----------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------|----------|--|
| Specific Gravity                        |                      |               | Assumed                     |                                     | To make $S_f = 100\%$ at end of test.                          |                                    |                                                                        |          |  |
| $G_s = 2.660$                           |                      | X             | Measured                    |                                     | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_f = 100\%$ |                                    |                                                                        |          |  |
| Mass Dry Soil, (g)                      | Initial: 99.56       | X             | From Cal. Routine No.       | 5                                   | Note: Routine #5 is based on final measurements.               |                                    |                                                                        |          |  |
|                                         | Final (4): NA        |               | Make $S_f = 100\%$ , or,    |                                     | Avg. of measured & make $S_f = 100\%$                          |                                    |                                                                        |          |  |
| Initial Height (mm) =                   |                      |               | 18.92                       | X                                   | Measured ;                                                     |                                    | Back Calculated Back-cal. Sat. (%) = NA                                |          |  |
| Final Height (mm) =                     |                      |               | 17.61                       | X                                   | Measured ;                                                     |                                    | Initial $H_o$ & dial change during loading                             |          |  |
|                                         | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                              | Height of Solids, $H_s$ (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) : |          |  |
| Initial                                 | 18.5                 | 0.602         | 81.8                        | 122.7                               | 103.5                                                          | 11.814                             | From                                                                   | To (ksf) |  |
| Final                                   | 18.4                 | 0.490         | 99.8                        | 131.7                               | 111.2                                                          | NA                                 | NA                                                                     | NA       |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\varepsilon_a$ (%)               | CR    | RR    | OCR | Liquid Limit (LL)     | 39 | Minus 200 (%) |
| Casagrande Method      | 19.60             | NA                                | 0.095 | 0.009 | 2.7 | Plastic Limit (PL)    | 17 | 54.7          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 22 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF

Reviewed By: HP 

Date: 3/31/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686      Test Station No.: CRS-1      File Name: B-2319\_UD7a  
 Task No.: NA      Date; Start: 3/25/2008      Initial Height,  $H_o$  (mm): 18.92  
 Project Name: Exelon (Victoria)      Completed: 3/28/2008      Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7385  
 Test: Initial / Pressure      Gauge Back Pressure,  $U_G$  (psi): 70      ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values:      Back Pressure,  $U_{b,BE}$  (psi): 70.50734 ,V: 0.02280863      Piston Uplift,  $P_{up}$  (lbf): 34.63  
                                          Back Pressure,  $U_{b,CS}$  (psi): 70.50605 ,V: 0.02280821      Setup  $DT_{ref}$  (V): 0.04501135  
 Displacement Transducer No.: DT-101      Calib. Factor (mm/V): -213.274      Ch. No.: 1  
 Pore Press. Transducer No.: PT-107      Calib. Factor (psi/V): 3086.313      Ref. Zero (V): -0.000037      Ch. No.: 2  
 Force Cell No.: FT-099      Calib. Factor (lbf/V): 161209.607      Ref. Zero (V): -0.000101      Ch. No.: 3

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
     US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF      Reviewed By: HP **HP**

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 85                    | 16 : 43 : 00         |                                                                    | 1.14                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 85                    | 16 : 55 : 00         |                                                                    | 1.44                                                        |                                                            | 0.041                                                         | 0.029                                                                 | 0.012                                                                   |                                                                              |
| BE                           | 86                    | 09 : 24 : 00         |                                                                    | 1.25                                                        | 0.000                                                      | 0.013                                                         | 0.026                                                                 | -0.013                                                                  |                                                                              |
| CS                           | 86                    | 09 : 25 : 00         | 0                                                                  | 1.25                                                        | 0.000                                                      | 0.012                                                         | 0.026                                                                 | -0.014                                                                  |                                                                              |
|                              | 86                    | 09 : 39 : 00         | 14                                                                 | 1.60                                                        | 0.001                                                      | 0.047                                                         | 0.032                                                                 | 0.015                                                                   | 0.656                                                                        |
|                              | 86                    | 09 : 53 : 00         | 28                                                                 | 1.97                                                        | 0.002                                                      | 0.105                                                         | 0.038                                                                 | 0.067                                                                   | 1.162                                                                        |
| US                           | 86                    | 10 : 10 : 00         | 45                                                                 | 2.69                                                        | 0.001                                                      | 0.198                                                         | 0.049                                                                 | 0.149                                                                   | 1.544                                                                        |
|                              | 86                    | 10 : 38 : 00         | 73                                                                 | 4.63                                                        | 0.007                                                      | 0.358                                                         | 0.074                                                                 | 0.284                                                                   | 1.527                                                                        |
|                              | 86                    | 11 : 06 : 00         | 101                                                                | 7.86                                                        | 0.015                                                      | 0.523                                                         | 0.103                                                                 | 0.420                                                                   | 1.534                                                                        |
|                              | 86                    | 11 : 34 : 00         | 129                                                                | 12.07                                                       | 0.025                                                      | 0.686                                                         | 0.129                                                                 | 0.557                                                                   | 1.556                                                                        |
|                              | 86                    | 12 : 02 : 00         | 157                                                                | 16.52                                                       | 0.037                                                      | 0.847                                                         | 0.149                                                                 | 0.698                                                                   | 1.597                                                                        |
|                              | 86                    | 12 : 30 : 00         | 185                                                                | 21.22                                                       | 0.048                                                      | 1.009                                                         | 0.166                                                                 | 0.843                                                                   | 1.641                                                                        |
|                              | 86                    | 12 : 58 : 00         | 213                                                                | 26.26                                                       | 0.060                                                      | 1.166                                                         | 0.182                                                                 | 0.984                                                                   | 1.597                                                                        |
|                              | 86                    | 13 : 26 : 00         | 241                                                                | 32.04                                                       | 0.081                                                      | 1.322                                                         | 0.198                                                                 | 1.124                                                                   | 1.589                                                                        |
|                              | 86                    | 13 : 54 : 00         | 269                                                                | 38.51                                                       | 0.102                                                      | 1.474                                                         | 0.215                                                                 | 1.259                                                                   | 1.526                                                                        |
|                              | 86                    | 14 : 22 : 00         | 297                                                                | 45.89                                                       | 0.130                                                      | 1.624                                                         | 0.233                                                                 | 1.390                                                                   | 1.487                                                                        |
|                              | 86                    | 14 : 50 : 00         | 325                                                                | 54.11                                                       | 0.156                                                      | 1.769                                                         | 0.253                                                                 | 1.516                                                                   | 1.421                                                                        |
|                              | 86                    | 15 : 18 : 00         | 353                                                                | 63.42                                                       | 0.192                                                      | 1.913                                                         | 0.276                                                                 | 1.637                                                                   | 1.374                                                                        |
|                              | 86                    | 15 : 46 : 00         | 381                                                                | 73.61                                                       | 0.224                                                      | 2.053                                                         | 0.301                                                                 | 1.752                                                                   | 1.299                                                                        |
|                              | 86                    | 16 : 14 : 00         | 409                                                                | 84.35                                                       | 0.282                                                      | 2.183                                                         | 0.327                                                                 | 1.857                                                                   | 1.186                                                                        |
|                              | 86                    | 16 : 42 : 00         | 437                                                                | 96.00                                                       | 0.325                                                      | 2.312                                                         | 0.355                                                                 | 1.957                                                                   | 1.135                                                                        |
|                              | 86                    | 17 : 10 : 00         | 465                                                                | 109.15                                                      | 0.400                                                      | 2.445                                                         | 0.388                                                                 | 2.057                                                                   | 1.134                                                                        |
| UE                           | 86                    | 17 : 38 : 00         | 493                                                                | 122.92                                                      | 0.516                                                      | 2.571                                                         | 0.422                                                                 | 2.150                                                                   | 1.048                                                                        |
|                              | 86                    | 18 : 06 : 00         | 521                                                                | 137.56                                                      | 0.598                                                      | 2.698                                                         | 0.458                                                                 | 2.240                                                                   | 1.025                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 86                    | 18 : 24 : 00         | 539                                                                | 147.95                                                      | 0.721                                                      | 2.780                                                         | 0.484                                                                 | 2.296                                                                   | 0.989                                                                        |
|                              | 86                    | 18 : 26 : 00         | 541                                                                | 146.98                                                      | 0.408                                                      | 2.784                                                         | 0.483                                                                 | 2.301                                                                   | 0.782                                                                        |
|                              | 86                    | 19 : 06 : 00         | 581                                                                | 141.82                                                      | 0.037                                                      | 2.800                                                         | 0.475                                                                 | 2.325                                                                   | 0.187                                                                        |
|                              | 86                    | 19 : 46 : 00         | 621                                                                | 137.07                                                      | -0.027                                                     | 2.796                                                         | 0.467                                                                 | 2.329                                                                   | 0.033                                                                        |
|                              | 86                    | 20 : 26 : 00         | 661                                                                | 118.70                                                      | -0.059                                                     | 2.757                                                         | 0.438                                                                 | 2.319                                                                   | -0.076                                                                       |
|                              | 86                    | 21 : 06 : 00         | 701                                                                | 99.48                                                       | -0.074                                                     | 2.712                                                         | 0.404                                                                 | 2.309                                                                   | -0.085                                                                       |
|                              | 86                    | 21 : 46 : 00         | 741                                                                | 81.47                                                       | -0.088                                                     | 2.667                                                         | 0.369                                                                 | 2.298                                                                   | -0.084                                                                       |
|                              | 86                    | 22 : 26 : 00         | 781                                                                | 64.44                                                       | -0.099                                                     | 2.617                                                         | 0.332                                                                 | 2.285                                                                   | -0.102                                                                       |
| US                           | 86                    | 23 : 06 : 00         | 821                                                                | 49.25                                                       | -0.125                                                     | 2.566                                                         | 0.295                                                                 | 2.270                                                                   | -0.117                                                                       |
|                              | 86                    | 23 : 46 : 00         | 861                                                                | 36.34                                                       | -0.140                                                     | 2.511                                                         | 0.259                                                                 | 2.252                                                                   | -0.146                                                                       |
|                              | 87                    | 00 : 26 : 00         | 901                                                                | 25.79                                                       | -0.171                                                     | 2.454                                                         | 0.225                                                                 | 2.229                                                                   | -0.187                                                                       |
|                              | 87                    | 01 : 06 : 00         | 941                                                                | 17.15                                                       | -0.216                                                     | 2.386                                                         | 0.192                                                                 | 2.194                                                                   | -0.274                                                                       |
| UE                           | 87                    | 01 : 18 : 00         | 953                                                                | 15.15                                                       | -0.217                                                     | 2.365                                                         | 0.184                                                                 | 2.181                                                                   | -0.345                                                                       |
|                              | 87                    | 01 : 20 : 00         | 955                                                                | 15.23                                                       | -0.113                                                     | 2.364                                                         | 0.184                                                                 | 2.180                                                                   | -0.205                                                                       |
|                              | 87                    | 01 : 28 : 00         | 963                                                                | 17.32                                                       | 0.167                                                      | 2.369                                                         | 0.193                                                                 | 2.176                                                                   | -0.134                                                                       |
|                              | 87                    | 01 : 36 : 00         | 971                                                                | 22.30                                                       | 0.242                                                      | 2.395                                                         | 0.213                                                                 | 2.182                                                                   | 0.224                                                                        |
|                              | 87                    | 01 : 44 : 00         | 979                                                                | 27.36                                                       | 0.261                                                      | 2.419                                                         | 0.231                                                                 | 2.189                                                                   | 0.265                                                                        |
| US                           | 87                    | 01 : 52 : 00         | 987                                                                | 32.52                                                       | 0.268                                                      | 2.445                                                         | 0.247                                                                 | 2.198                                                                   | 0.365                                                                        |
|                              | 87                    | 02 : 00 : 00         | 995                                                                | 37.12                                                       | 0.256                                                      | 2.467                                                         | 0.261                                                                 | 2.206                                                                   | 0.319                                                                        |
|                              | 87                    | 02 : 08 : 00         | 1003                                                               | 42.58                                                       | 0.258                                                      | 2.490                                                         | 0.277                                                                 | 2.213                                                                   | 0.295                                                                        |
|                              | 87                    | 02 : 16 : 00         | 1011                                                               | 48.25                                                       | 0.260                                                      | 2.515                                                         | 0.292                                                                 | 2.223                                                                   | 0.375                                                                        |
|                              | 87                    | 02 : 24 : 00         | 1019                                                               | 54.21                                                       | 0.262                                                      | 2.537                                                         | 0.308                                                                 | 2.230                                                                   | 0.277                                                                        |
|                              | 87                    | 02 : 32 : 00         | 1027                                                               | 60.39                                                       | 0.255                                                      | 2.561                                                         | 0.323                                                                 | 2.239                                                                   | 0.349                                                                        |
|                              | 87                    | 02 : 40 : 00         | 1035                                                               | 66.51                                                       | 0.236                                                      | 2.584                                                         | 0.337                                                                 | 2.248                                                                   | 0.358                                                                        |
|                              | 87                    | 02 : 48 : 00         | 1043                                                               | 72.40                                                       | 0.228                                                      | 2.604                                                         | 0.350                                                                 | 2.254                                                                   | 0.270                                                                        |
|                              | 87                    | 02 : 56 : 00         | 1051                                                               | 78.14                                                       | 0.242                                                      | 2.626                                                         | 0.362                                                                 | 2.263                                                                   | 0.362                                                                        |
|                              | 87                    | 03 : 04 : 00         | 1059                                                               | 84.47                                                       | 0.249                                                      | 2.646                                                         | 0.375                                                                 | 2.271                                                                   | 0.306                                                                        |
|                              | 87                    | 03 : 12 : 00         | 1067                                                               | 91.37                                                       | 0.278                                                      | 2.669                                                         | 0.388                                                                 | 2.281                                                                   | 0.383                                                                        |
|                              | 87                    | 03 : 20 : 00         | 1075                                                               | 98.60                                                       | 0.305                                                      | 2.695                                                         | 0.402                                                                 | 2.293                                                                   | 0.475                                                                        |
|                              | 87                    | 03 : 28 : 00         | 1083                                                               | 104.84                                                      | 0.270                                                      | 2.715                                                         | 0.414                                                                 | 2.302                                                                   | 0.357                                                                        |
|                              | 87                    | 03 : 36 : 00         | 1091                                                               | 111.55                                                      | 0.327                                                      | 2.740                                                         | 0.425                                                                 | 2.315                                                                   | 0.509                                                                        |
|                              | 87                    | 03 : 44 : 00         | 1099                                                               | 118.18                                                      | 0.368                                                      | 2.764                                                         | 0.437                                                                 | 2.327                                                                   | 0.482                                                                        |
|                              | 87                    | 03 : 52 : 00         | 1107                                                               | 124.88                                                      | 0.439                                                      | 2.789                                                         | 0.448                                                                 | 2.341                                                                   | 0.555                                                                        |
|                              | 87                    | 04 : 00 : 00         | 1115                                                               | 132.01                                                      | 0.500                                                      | 2.818                                                         | 0.459                                                                 | 2.359                                                                   | 0.710                                                                        |
|                              | 87                    | 04 : 08 : 00         | 1123                                                               | 138.59                                                      | 0.526                                                      | 2.845                                                         | 0.470                                                                 | 2.375                                                                   | 0.655                                                                        |
|                              | 87                    | 04 : 16 : 00         | 1131                                                               | 144.81                                                      | 0.580                                                      | 2.874                                                         | 0.479                                                                 | 2.395                                                                   | 0.780                                                                        |
| UE                           | 87                    | 04 : 20 : 00         | 1135                                                               | 147.72                                                      | 0.589                                                      | 2.887                                                         | 0.484                                                                 | 2.403                                                                   | 0.659                                                                        |
|                              | 87                    | 04 : 22 : 00         | 1137                                                               | 147.17                                                      | 0.304                                                      | 2.889                                                         | 0.483                                                                 | 2.406                                                                   | 0.470                                                                        |
|                              | 87                    | 05 : 26 : 00         | 1201                                                               | 142.78                                                      | -0.003                                                     | 2.901                                                         | 0.476                                                                 | 2.425                                                                   | 0.093                                                                        |
|                              | 87                    | 06 : 30 : 00         | 1265                                                               | 117.52                                                      | -0.095                                                     | 2.850                                                         | 0.436                                                                 | 2.414                                                                   | -0.054                                                                       |
|                              | 87                    | 07 : 34 : 00         | 1329                                                               | 87.20                                                       | -0.127                                                     | 2.779                                                         | 0.380                                                                 | 2.399                                                                   | -0.077                                                                       |
|                              | 87                    | 08 : 38 : 00         | 1393                                                               | 59.90                                                       | -0.157                                                     | 2.705                                                         | 0.322                                                                 | 2.383                                                                   | -0.078                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-1 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2319\_UD7

Task No.: NA Date: Start: 3/25/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.5 Piston Uplift,  $P_{up}$  (lbf): 34.63

Project Name: Exelon (Victoria) Completed: 3/28/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt ; in ☐ g/kg

Final Description of Specimen: Light Yellowish Brown Sandy Lean CLAY (CL)

Ring No.: 1 Area,  $A_r$  (cm<sup>2</sup>): 31.739 Solids Ht.,  $H_s$  (mm): 11.814 Specific Gravity,  $G_s = 2.660$  ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 18.92 Water 18.5 Void 0.602 Deg. of 81.8 Total Unit 122.7 Dry Unit 103.5  
**Final:** (mm):  $H_f$ : 17.61 Content,  $w$  (%): 18.4 Ratio,  $e$ : 0.490 Sat.,  $S$  (%): 99.8 Weight,  $\gamma_t$  (pcf): 131.7 Weight,  $\gamma_d$  (pcf): 111.2

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF Reviewed By: *HP*

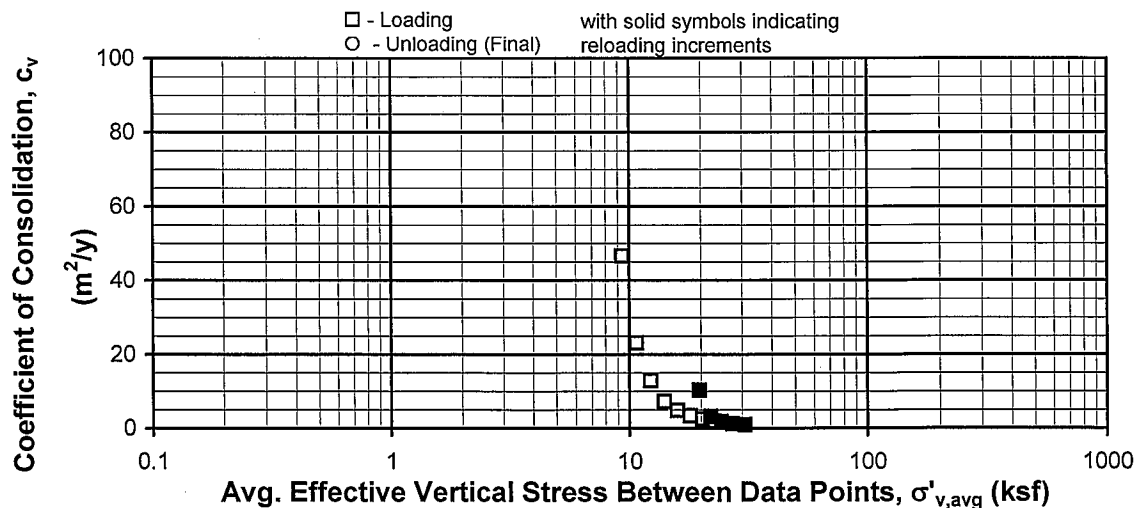
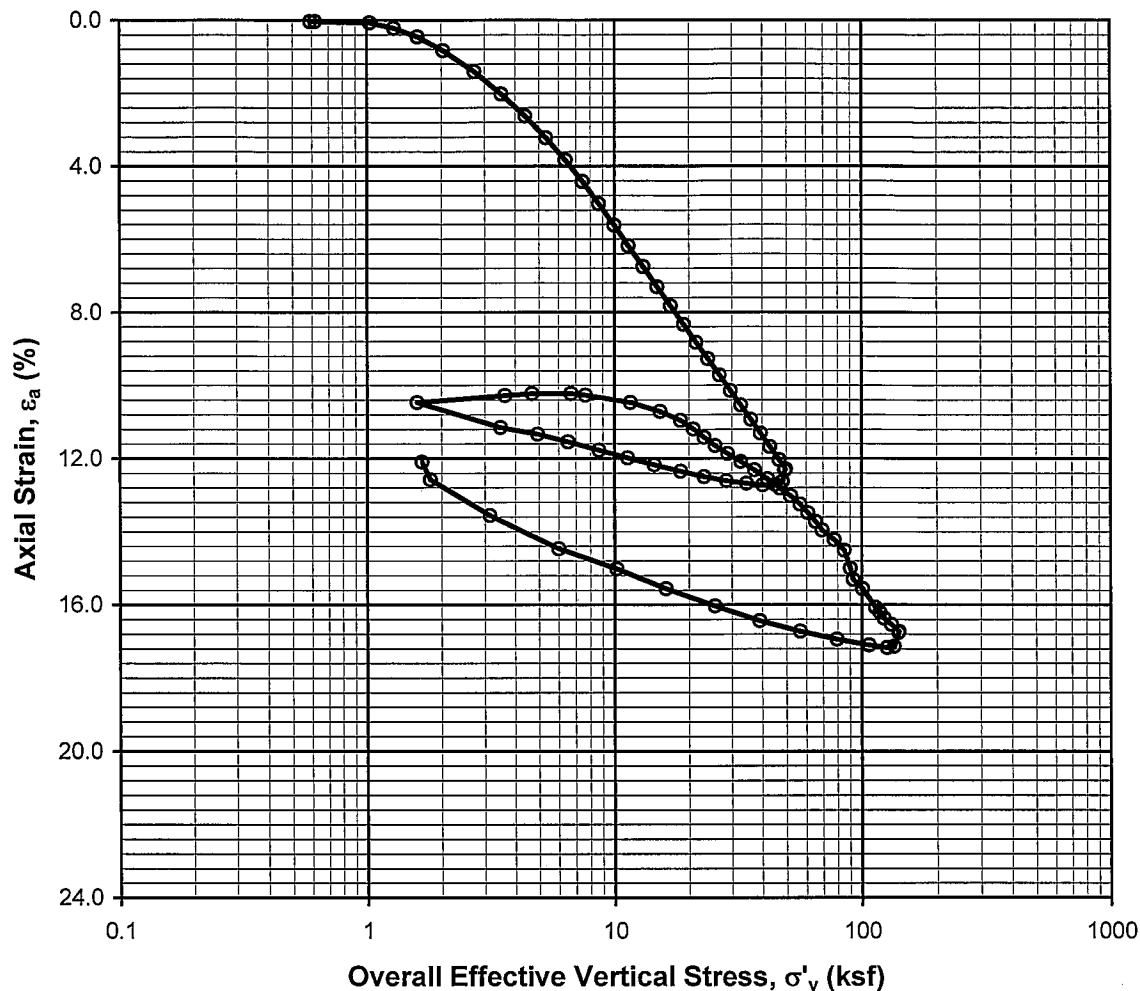
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 1.14                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | 0.06                                                                                                                  | 0.601                              | 1.44                                                    |                                                                |                                                                                         | 18.910                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 1.25                                                                    | -0.07                                                                                                                 | 0.603                              | 1.25                                                    | 0.000                                                          | 0.0                                                                                     | 18.935                                                |                                                                           |                                                                     | 0.602                                  |                                                   |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 1.25                                                                    | -0.07                                                                                                                 | 0.603                              | 1.25                                                    | 0.000                                                          | 0.0                                                                                     | 18.936                                                |                                                                           |                                                                     | 0.603                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14                                                                       | 1.60                                                                    | 0.08                                                                                                                  | 0.600                              | 1.60                                                    | 0.001                                                          | 0.1                                                                                     | 18.907                                                | 1.42                                                                      |                                                                     | 0.602                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 28                                                                       | 1.97                                                                    | 0.35                                                                                                                  | 0.596                              | 1.97                                                    | 0.002                                                          | 0.1                                                                                     | 18.855                                                | 1.78                                                                      |                                                                     | 0.598                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 45                                                                       | 2.69                                                                    | 0.79                                                                                                                  | 0.589                              | 2.69                                                    | 0.001                                                          | 0.1                                                                                     | 18.773                                                | 2.33                                                                      |                                                                     | 0.592                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 73                                                                       | 4.62                                                                    | 1.50                                                                                                                  | 0.578                              | 4.63                                                    | 0.007                                                          | 0.1                                                                                     | 18.638                                                | 3.66                                                                      | 1605.99                                                             | 0.583                                  | 1.18E+00                                          | 489.05                                                                                         |                                                                                                  |
|                              | 101                                                                      | 7.85                                                                    | 2.22                                                                                                                  | 0.566                              | 7.86                                                    | 0.015                                                          | 0.2                                                                                     | 18.502                                                | 6.24                                                                      | 986.45                                                              | 0.572                                  | 4.36E-01                                          | 609.56                                                                                         |                                                                                                  |
|                              | 129                                                                      | 12.05                                                                   | 2.94                                                                                                                  | 0.554                              | 12.07                                                   | 0.025                                                          | 0.2                                                                                     | 18.365                                                | 9.95                                                                      | 682.20                                                              | 0.560                                  | 2.37E-01                                          | 641.73                                                                                         |                                                                                                  |
|                              | 157                                                                      | 16.50                                                                   | 3.69                                                                                                                  | 0.543                              | 16.52                                                   | 0.037                                                          | 0.2                                                                                     | 18.224                                                | 14.27                                                                     | 459.30                                                              | 0.549                                  | 1.56E-01                                          | 584.87                                                                                         |                                                                                                  |
|                              | 185                                                                      | 21.19                                                                   | 4.46                                                                                                                  | 0.530                              | 21.22                                                   | 0.048                                                          | 0.2                                                                                     | 18.079                                                | 18.84                                                                     | 343.59                                                              | 0.536                                  | 1.14E-01                                          | 555.56                                                                                         |                                                                                                  |
|                              | 213                                                                      | 26.22                                                                   | 5.20                                                                                                                  | 0.518                              | 26.26                                                   | 0.060                                                          | 0.2                                                                                     | 17.938                                                | 23.71                                                                     | 283.80                                                              | 0.524                                  | 8.54E-02                                          | 559.43                                                                                         |                                                                                                  |
|                              | 241                                                                      | 31.99                                                                   | 5.94                                                                                                                  | 0.506                              | 32.04                                                   | 0.081                                                          | 0.3                                                                                     | 17.798                                                | 29.10                                                                     | 246.58                                                              | 0.512                                  | 6.46E-02                                          | 576.03                                                                                         |                                                                                                  |
|                              | 269                                                                      | 38.44                                                                   | 6.65                                                                                                                  | 0.495                              | 38.51                                                   | 0.102                                                          | 0.3                                                                                     | 17.663                                                | 35.21                                                                     | 209.46                                                              | 0.501                                  | 4.70E-02                                          | 567.93                                                                                         |                                                                                                  |
|                              | 297                                                                      | 45.81                                                                   | 7.35                                                                                                                  | 0.484                              | 45.89                                                   | 0.130                                                          | 0.3                                                                                     | 17.532                                                | 42.12                                                                     | 185.62                                                              | 0.490                                  | 3.56E-02                                          | 574.78                                                                                         |                                                                                                  |
|                              | 325                                                                      | 54.01                                                                   | 8.01                                                                                                                  | 0.473                              | 54.11                                                   | 0.156                                                          | 0.3                                                                                     | 17.406                                                | 49.91                                                                     | 165.14                                                              | 0.479                                  | 2.72E-02                                          | 576.58                                                                                         |                                                                                                  |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 353                                                                      | 63.29                                                                   | 8.65                                                                                                                        | 0.463                              | 63.42                                                   | 0.192                                                          | 0.3                                                                                     | 17.285                                                | 58.65                                                                     | 151.54                                                              | 0.468                                  | 2.13E-02                                          | 590.31                                                                                         |                                                                                                        |
|                              | 381                                                                      | 73.46                                                                   | 9.26                                                                                                                        | 0.453                              | 73.61                                                   | 0.224                                                          | 0.3                                                                                     | 17.170                                                | 68.38                                                                     | 136.64                                                              | 0.458                                  | 1.66E-02                                          | 588.66                                                                                         |                                                                                                        |
|                              | 409                                                                      | 84.16                                                                   | 9.81                                                                                                                        | 0.444                              | 84.35                                                   | 0.282                                                          | 0.3                                                                                     | 17.065                                                | 78.81                                                                     | 116.77                                                              | 0.449                                  | 1.23E-02                                          | 552.00                                                                                         |                                                                                                        |
|                              | 437                                                                      | 95.78                                                                   | 10.34                                                                                                                       | 0.436                              | 96.00                                                   | 0.325                                                          | 0.3                                                                                     | 16.965                                                | 89.97                                                                     | 104.40                                                              | 0.440                                  | 9.70E-03                                          | 537.90                                                                                         |                                                                                                        |
|                              | 465                                                                      | 108.88                                                                  | 10.87                                                                                                                       | 0.428                              | 109.15                                                  | 0.400                                                          | 0.4                                                                                     | 16.865                                                | 102.33                                                                    | 97.41                                                               | 0.432                                  | 8.01E-03                                          | 544.11                                                                                         |                                                                                                        |
| UE                           | 493                                                                      | 122.58                                                                  | 11.36                                                                                                                       | 0.420                              | 122.92                                                  | 0.516                                                          | 0.4                                                                                     | 16.772                                                | 115.73                                                                    | 79.84                                                               | 0.424                                  | 5.80E-03                                          | 481.14                                                                                         |                                                                                                        |
|                              | 521                                                                      | 137.17                                                                  | 11.84                                                                                                                       | 0.412                              | 137.56                                                  | 0.598                                                          | 0.4                                                                                     | 16.682                                                | 129.87                                                                    |                                                                     | 0.416                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 539                                                                      | 147.46                                                                  | 12.14                                                                                                                       | 0.407                              | 147.95                                                  | 0.721                                                          | 0.5                                                                                     | 16.626                                                | 142.32                                                                    |                                                                     | 0.410                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 541                                                                      | 146.71                                                                  | 12.16                                                                                                                       | 0.407                              | 146.98                                                  | 0.408                                                          | 0.3                                                                                     | 16.621                                                | 147.09                                                                    |                                                                     | 0.407                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 581                                                                      | 141.80                                                                  | 12.29                                                                                                                       | 0.405                              | 141.82                                                  | 0.037                                                          | 0.0                                                                                     | 16.597                                                | 144.26                                                                    |                                                                     | 0.406                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 621                                                                      | 137.09                                                                  | 12.31                                                                                                                       | 0.405                              | 137.07                                                  | -0.027                                                         | 0.0                                                                                     | 16.593                                                | 139.44                                                                    |                                                                     | 0.405                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 661                                                                      | 118.74                                                                  | 12.26                                                                                                                       | 0.405                              | 118.70                                                  | -0.059                                                         | 0.0                                                                                     | 16.603                                                | 127.91                                                                    |                                                                     | 0.405                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 701                                                                      | 99.53                                                                   | 12.20                                                                                                                       | 0.406                              | 99.48                                                   | -0.074                                                         | -0.1                                                                                    | 16.613                                                | 109.13                                                                    |                                                                     | 0.406                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 741                                                                      | 81.53                                                                   | 12.15                                                                                                                       | 0.407                              | 81.47                                                   | -0.088                                                         | -0.1                                                                                    | 16.624                                                | 90.53                                                                     |                                                                     | 0.407                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 781                                                                      | 64.50                                                                   | 12.08                                                                                                                       | 0.408                              | 64.44                                                   | -0.099                                                         | -0.2                                                                                    | 16.637                                                | 73.02                                                                     |                                                                     | 0.408                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 821                                                                      | 49.34                                                                   | 12.00                                                                                                                       | 0.409                              | 49.25                                                   | -0.125                                                         | -0.3                                                                                    | 16.652                                                | 56.92                                                                     |                                                                     | 0.409                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 861                                                                      | 36.43                                                                   | 11.90                                                                                                                       | 0.411                              | 36.34                                                   | -0.140                                                         | -0.4                                                                                    | 16.670                                                | 42.88                                                                     | 179.61                                                              | 0.410                                  | 2.73E-03                                          | 98.49                                                                                          |                                                                                                        |
|                              | 901                                                                      | 25.91                                                                   | 11.78                                                                                                                       | 0.413                              | 25.79                                                   | -0.171                                                         | -0.7                                                                                    | 16.693                                                | 31.17                                                                     | 125.67                                                              | 0.412                                  | 2.99E-03                                          | 137.48                                                                                         |                                                                                                        |
|                              | 941                                                                      | 17.30                                                                   | 11.59                                                                                                                       | 0.416                              | 17.15                                                   | -0.216                                                         | -1.3                                                                                    | 16.728                                                | 21.60                                                                     | 83.44                                                               | 0.414                                  | 3.53E-03                                          | 136.45                                                                                         |                                                                                                        |
| UE                           | 953                                                                      | 15.29                                                                   | 11.53                                                                                                                       | 0.417                              | 15.15                                                   | -0.217                                                         | -1.4                                                                                    | 16.741                                                | 16.30                                                                     | 57.12                                                               | 0.416                                  | 3.97E-03                                          | 102.45                                                                                         |                                                                                                        |
|                              | 955                                                                      | 15.31                                                                   | 11.52                                                                                                                       | 0.417                              | 15.23                                                   | -0.113                                                         | -0.7                                                                                    | 16.742                                                | 15.30                                                                     |                                                                     | 0.417                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 963                                                                      | 17.21                                                                   | 11.50                                                                                                                       | 0.417                              | 17.32                                                   | 0.167                                                          | 1.0                                                                                     | 16.746                                                | 16.26                                                                     |                                                                     | 0.417                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 971                                                                      | 22.14                                                                   | 11.53                                                                                                                       | 0.417                              | 22.30                                                   | 0.242                                                          | 1.1                                                                                     | 16.740                                                | 19.68                                                                     |                                                                     | 0.417                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 979                                                                      | 27.18                                                                   | 11.57                                                                                                                       | 0.416                              | 27.36                                                   | 0.261                                                          | 1.0                                                                                     | 16.733                                                | 24.66                                                                     |                                                                     | 0.417                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 987                                                                      | 32.34                                                                   | 11.62                                                                                                                       | 0.416                              | 32.52                                                   | 0.268                                                          | 0.8                                                                                     | 16.724                                                | 29.76                                                                     |                                                                     | 0.416                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 995                                                                      | 36.95                                                                   | 11.66                                                                                                                       | 0.415                              | 37.12                                                   | 0.256                                                          | 0.7                                                                                     | 16.716                                                | 34.64                                                                     | 160.77                                                              | 0.415                                  | 3.05E-03                                          | 17.51                                                                                          |                                                                                                        |
|                              | 1003                                                                     | 42.41                                                                   | 11.70                                                                                                                       | 0.414                              | 42.58                                                   | 0.258                                                          | 0.6                                                                                     | 16.709                                                | 39.68                                                                     | 194.60                                                              | 0.415                                  | 2.87E-03                                          | 42.42                                                                                          |                                                                                                        |
|                              | 1011                                                                     | 48.08                                                                   | 11.75                                                                                                                       | 0.413                              | 48.25                                                   | 0.260                                                          | 0.5                                                                                     | 16.699                                                | 45.24                                                                     | 200.10                                                              | 0.414                                  | 3.61E-03                                          | 65.49                                                                                          |                                                                                                        |
|                              | 1019                                                                     | 54.04                                                                   | 11.78                                                                                                                       | 0.413                              | 54.21                                                   | 0.262                                                          | 0.5                                                                                     | 16.692                                                | 51.06                                                                     | 208.74                                                              | 0.413                                  | 2.64E-03                                          | 91.19                                                                                          |                                                                                                        |
|                              | 1027                                                                     | 60.22                                                                   | 11.83                                                                                                                       | 0.412                              | 60.39                                                   | 0.255                                                          | 0.4                                                                                     | 16.683                                                | 57.13                                                                     | 218.36                                                              | 0.413                                  | 3.36E-03                                          | 119.35                                                                                         |                                                                                                        |

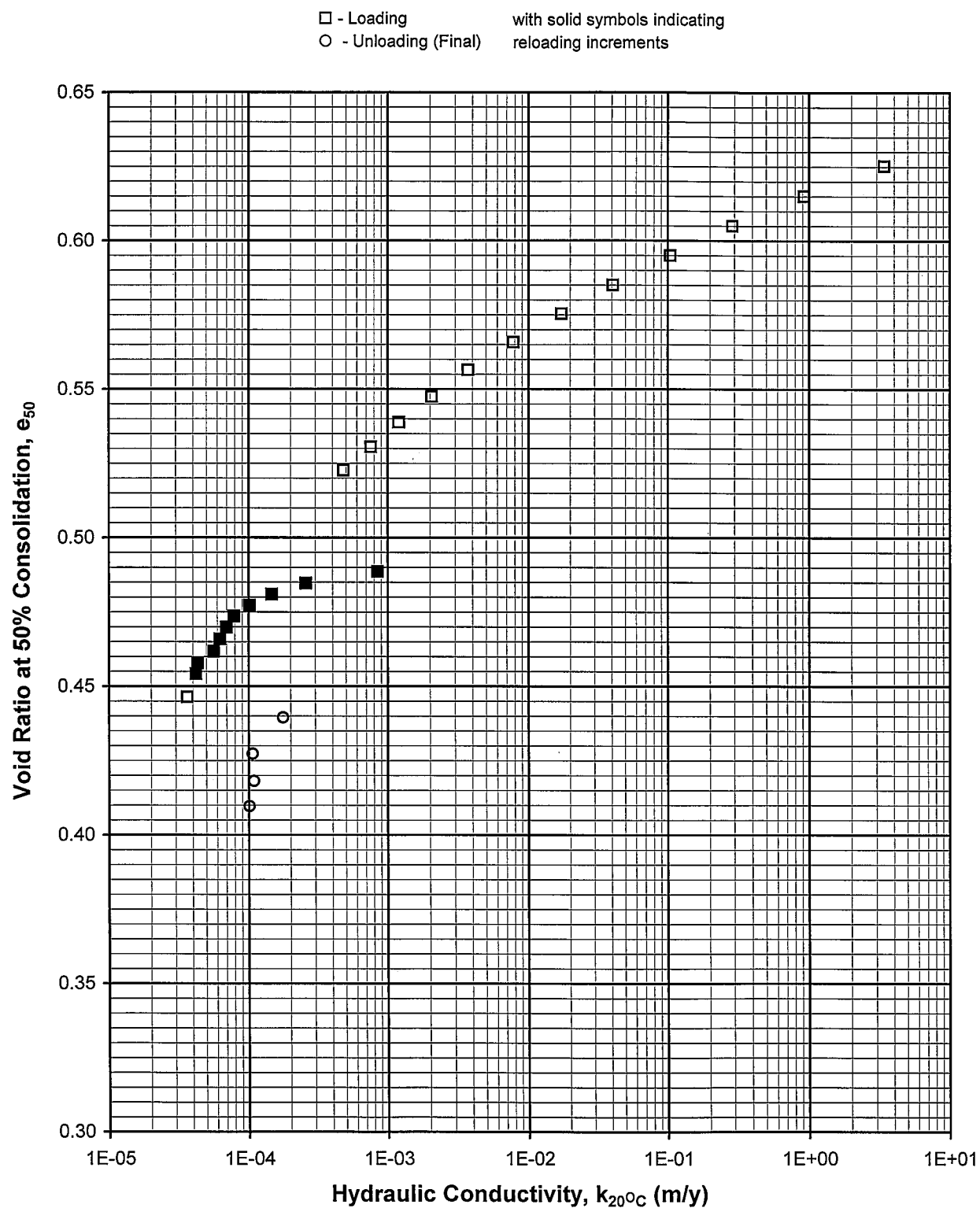
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
|                              | 1035                                                                     | 66.35                                                                   | 11.88                                                                                                                       | 0.411                              | 66.51                                                   | 0.236                                                          | 0.4                                                                                     | 16.674                                                | 63.29                                                                     | 227.13                                                      | 0.412                                  | 3.62E-03                                          | 149.13                                                                                              |                                                                                                       |
|                              | 1043                                                                     | 72.25                                                                   | 11.91                                                                                                                       | 0.411                              | 72.40                                                   | 0.228                                                          | 0.3                                                                                     | 16.668                                                | 69.30                                                                     | 231.21                                                      | 0.411                                  | 2.89E-03                                          | 177.27                                                                                              |                                                                                                       |
|                              | 1051                                                                     | 77.98                                                                   | 11.96                                                                                                                       | 0.410                              | 78.14                                                   | 0.242                                                          | 0.3                                                                                     | 16.659                                                | 75.11                                                                     | 222.61                                                      | 0.410                                  | 3.82E-03                                          | 195.25                                                                                              |                                                                                                       |
|                              | 1059                                                                     | 84.31                                                                   | 12.00                                                                                                                       | 0.409                              | 84.47                                                   | 0.249                                                          | 0.3                                                                                     | 16.651                                                | 81.15                                                                     | 234.73                                                      | 0.410                                  | 3.09E-03                                          | 231.85                                                                                              |                                                                                                       |
|                              | 1067                                                                     | 91.18                                                                   | 12.05                                                                                                                       | 0.409                              | 91.37                                                   | 0.278                                                          | 0.3                                                                                     | 16.641                                                | 87.74                                                                     | 237.87                                                      | 0.409                                  | 3.61E-03                                          | 261.33                                                                                              |                                                                                                       |
|                              | 1075                                                                     | 98.39                                                                   | 12.12                                                                                                                       | 0.408                              | 98.60                                                   | 0.305                                                          | 0.3                                                                                     | 16.629                                                | 94.79                                                                     | 225.34                                                      | 0.408                                  | 4.03E-03                                          | 272.68                                                                                              |                                                                                                       |
|                              | 1083                                                                     | 104.66                                                                  | 12.16                                                                                                                       | 0.407                              | 104.84                                                  | 0.270                                                          | 0.3                                                                                     | 16.620                                                | 101.53                                                                    | 196.90                                                      | 0.407                                  | 3.07E-03                                          | 260.24                                                                                              |                                                                                                       |
|                              | 1091                                                                     | 111.33                                                                  | 12.23                                                                                                                       | 0.406                              | 111.55                                                  | 0.327                                                          | 0.3                                                                                     | 16.607                                                | 107.99                                                                    | 203.56                                                      | 0.406                                  | 4.21E-03                                          | 291.85                                                                                              |                                                                                                       |
|                              | 1099                                                                     | 117.94                                                                  | 12.30                                                                                                                       | 0.405                              | 118.18                                                  | 0.368                                                          | 0.3                                                                                     | 16.595                                                | 114.63                                                                    | 172.62                                                      | 0.405                                  | 3.42E-03                                          | 266.94                                                                                              |                                                                                                       |
|                              | 1107                                                                     | 124.59                                                                  | 12.37                                                                                                                       | 0.403                              | 124.88                                                  | 0.439                                                          | 0.4                                                                                     | 16.581                                                | 121.26                                                                    | 149.98                                                      | 0.404                                  | 3.39E-03                                          | 248.88                                                                                              |                                                                                                       |
|                              | 1115                                                                     | 131.67                                                                  | 12.47                                                                                                                       | 0.402                              | 132.01                                                  | 0.500                                                          | 0.4                                                                                     | 16.563                                                | 128.13                                                                    | 136.75                                                      | 0.403                                  | 3.72E-03                                          | 242.52                                                                                              |                                                                                                       |
|                              | 1123                                                                     | 138.24                                                                  | 12.55                                                                                                                       | 0.401                              | 138.59                                                  | 0.526                                                          | 0.4                                                                                     | 16.547                                                | 134.95                                                                    | 115.31                                                      | 0.401                                  | 3.13E-03                                          | 217.74                                                                                              |                                                                                                       |
|                              | 1131                                                                     | 144.42                                                                  | 12.66                                                                                                                       | 0.399                              | 144.81                                                  | 0.580                                                          | 0.4                                                                                     | 16.527                                                | 141.33                                                                    | 100.90                                                      | 0.400                                  | 3.45E-03                                          | 202.17                                                                                              |                                                                                                       |
| UE                           | 1135                                                                     | 147.33                                                                  | 12.70                                                                                                                       | 0.398                              | 147.72                                                  | 0.589                                                          | 0.4                                                                                     | 16.519                                                | 145.88                                                                    | 89.18                                                       | 0.399                                  | 2.76E-03                                          | 183.97                                                                                              |                                                                                                       |
|                              | 1137                                                                     | 146.96                                                                  | 12.72                                                                                                                       | 0.398                              | 147.17                                                  | 0.304                                                          | 0.2                                                                                     | 16.516                                                | 147.15                                                                    |                                                             | 0.398                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1201                                                                     | 142.78                                                                  | 12.82                                                                                                                       | 0.396                              | 142.78                                                  | -0.003                                                         | 0.0                                                                                     | 16.497                                                | 144.87                                                                    |                                                             | 0.397                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1265                                                                     | 117.59                                                                  | 12.76                                                                                                                       | 0.397                              | 117.52                                                  | -0.095                                                         | -0.1                                                                                    | 16.508                                                | 130.19                                                                    |                                                             | 0.397                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1329                                                                     | 87.29                                                                   | 12.68                                                                                                                       | 0.399                              | 87.20                                                   | -0.127                                                         | -0.1                                                                                    | 16.523                                                | 102.44                                                                    |                                                             | 0.398                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1393                                                                     | 60.01                                                                   | 12.59                                                                                                                       | 0.400                              | 59.90                                                   | -0.157                                                         | -0.3                                                                                    | 16.539                                                | 73.65                                                                     |                                                             | 0.399                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1457                                                                     | 37.91                                                                   | 12.46                                                                                                                       | 0.402                              | 37.80                                                   | -0.162                                                         | -0.4                                                                                    | 16.564                                                | 48.96                                                                     |                                                             | 0.401                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1521                                                                     | 21.38                                                                   | 12.23                                                                                                                       | 0.406                              | 21.23                                                   | -0.223                                                         | -1.1                                                                                    | 16.608                                                | 29.64                                                                     |                                                             | 0.404                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1585                                                                     | 10.85                                                                   | 11.84                                                                                                                       | 0.412                              | 10.66                                                   | -0.293                                                         | -2.8                                                                                    | 16.681                                                | 16.12                                                                     |                                                             | 0.409                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1649                                                                     | 5.70                                                                    | 11.27                                                                                                                       | 0.421                              | 5.49                                                    | -0.318                                                         | -5.8                                                                                    | 16.789                                                | 8.28                                                                      |                                                             | 0.417                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1713                                                                     | 3.39                                                                    | 10.59                                                                                                                       | 0.432                              | 3.20                                                    | -0.287                                                         | -9.0                                                                                    | 16.917                                                | 4.55                                                                      |                                                             | 0.427                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1777                                                                     | 2.27                                                                    | 9.82                                                                                                                        | 0.444                              | 2.12                                                    | -0.228                                                         | -10.8                                                                                   | 17.064                                                | 2.83                                                                      |                                                             | 0.438                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1785                                                                     | 2.16                                                                    | 9.72                                                                                                                        | 0.446                              | 2.01                                                    | -0.227                                                         | -11.3                                                                                   | 17.083                                                | 2.21                                                                      |                                                             | 0.445                                  |                                                   |                                                                                                     |                                                                                                       |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                             |                                        |                                                   |                                                                                                     |                                                                                                       |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                             |                                        |                                                   |                                                                                                     |                                                                                                       |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                             |                                        |                                                   |                                                                                                     |                                                                                                       |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                             |                                        |                                                   |                                                                                                     |                                                                                                       |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                             |                                        |                                                   |                                                                                                     |                                                                                                       |



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-1A - Depth 3.5 - 5.2 ft  
 Boring B-2321UD





**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-1A - Depth 3.5 - 5.2 ft  
Boring B-2321UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2321\_UD1a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Meas. ; ☐ Assumed Ring No.: 2  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.695  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                          |                                           |                                |                                   |                                  |                                           |                         |
|------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                     | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt.(lb)=                          | No. Layers =            |
| Sample No.: UD-1                         | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lb)=                        | Drop (in.) =            |
| Depth (ft): 3.5 - 5.2                    | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{nl}$ (%) =           | Dia. (in.) =            |
| Spec. Selection by X-ray;                | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort=                              | % Comp. = $\pm$ Opt.=   |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                  |                                | Mass Moist Soil + Ring (g)                           | 329.85  | 332.67 |
| Container No.                                            | 959                         | 2006             | 2009                                        | 522                            | Mass Ring (g)                                        | 212.92  |        |
| Mass Moist Soil + Container (g)                          | 117.28                      | 95.60            | 109.89                                      | 66.96                          | Mass Moist Soil, $M_{t,so}$ or $M_{t,at}$ (g)        | 116.93  | 119.75 |
| Mass Dry Soil + Container (g)                            | 104.47                      | 86.18            | 97.97                                       | 60.34                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 32.11                       | 30.37            | 30.52                                       | 30.24                          | Container No.                                        | 859     |        |
| WATER CONTENT (%)                                        | 17.70                       | 16.88            | 17.67                                       | 21.99                          | Mass Dry Soil + Container (g)                        | 32.00   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 17.42                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> Slice ; | Whole Spec.                    | Mass Container (g)                                   | 31.72   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.28    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 19.070 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 19.170                                                                                                                                                                       | 0.000                                  | 11.990                                    | 12.900                      | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 19.150  | 11.970 |
| 19.170                                                                                                                                                                       | 0.000                                  | 11.920                                    | 12.850                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 12.840 |
| 19.130                                                                                                                                                                       | 0.000                                  | 11.950                                    | 12.830                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 19.150  | 18.200 |
| 19.120                                                                                                                                                                       | 0.000                                  | 12.030                                    | 12.820                      | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 19.160                                                                                                                                                                       | 0.000                                  | 11.960                                    | 12.800                      | Initial Height, $H_o$                                   |                                                                     | 19.150  |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ | 0.786   |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           | 18.364  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             |                                                         | Final Soil Height Measurement, $H_{f,m}$                            | 18.200  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             |                                                         | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               | 0.86    |        |

| Estimated Initial Unit Weight |                                                     |                                           |                             | Soil Extruded During Loading                            |      |
|-------------------------------|-----------------------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf)=  | 120.27                                              | Dry, $\gamma_{d,o}$ (pcf)=                | 102.42                      | Container No.                                           |      |
| Filter Paper Used:            | <input checked="" type="checkbox"/> Whatman No. 54; | <input type="checkbox"/> Other            |                             | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test:             | Top & Bottom:                                       | <input type="checkbox"/> Yes ;            | <input type="checkbox"/> No | Mass Cont. (g)                                          | NA   |
| CRS Test:                     | Top Only:                                           | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Dark Gray Sandy Lean CLAY (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/24/2008 Date: 3/25/2008 Final Calc. By: LF Date: 3/31/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2321\_UD1a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |      |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial |
| 1                | Initial, Top, W1      | 17.70                    | 99.34                    | 73.5                         | 97.5                  | 95.2 |
| 2                | " Bottom, W2          | 16.88                    | 100.04                   | 71.3                         | 95.4                  | 93.0 |
| 3                | " Sides, W3           | 17.67                    | 99.37                    | 73.4                         | 97.4                  | 95.1 |
| 4                | " Average, W4         | 17.42                    | 99.58                    | 72.8                         | 96.8                  | 94.4 |
| 5                | " Back Calculated (1) | 18.78                    | 98.44 (3)                | 76.2                         | 100.2                 | 97.9 |
| 6                | Final                 | 21.99                    | 98.44 (2)                | 76.2                         | 100.2                 | 97.9 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. 5                                                                                     | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = 2.714                                                                                     |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.712                                                     |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11663 |
| Final Selected, $K_f$                                                           | 0.11663 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 98.52                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 98.48                                                 |  |                              |

| Summary of Specimen Physical Properties |                      |               |                             |                                     |                                   |                                                                |                                                                      |                                            |                         |
|-----------------------------------------|----------------------|---------------|-----------------------------|-------------------------------------|-----------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------|-------------------------|
| Specific Gravity<br>$G_s = 2.710$       |                      |               |                             | Assumed                             |                                   | To make $S_r = 100\%$ at end of test.                          |                                                                      |                                            |                         |
|                                         |                      |               | X                           | Measured                            |                                   | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_r = 100\%$ |                                                                      |                                            |                         |
| Mass Dry Soil, (g)                      | Initial: 98.44       |               | X                           | From Cal. Routine No.               |                                   | 5                                                              | Note: Routine #5 is based on final measurements.                     |                                            |                         |
|                                         | Final (4): NA        |               |                             | Make $S_r = 100\%$ , or;            |                                   |                                                                | Avg. of measured & make $S_r = 100\%$                                |                                            |                         |
| Initial Height (mm) = 19.15             |                      |               |                             | X                                   | Measured ;                        |                                                                |                                                                      | Back Calculated                            | Back-cal. Sat. (%) = NA |
| Final Height (mm) = 18.20               |                      |               |                             | X                                   | Measured ;                        |                                                                |                                                                      | Initial $H_o$ & dial change during loading |                         |
|                                         | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf) | Height of Solids, $H_s$ (2,4) (mm)                             | Extruded soil loss proportioned in increasing loading increments (5) |                                            |                         |
| Initial                                 | 18.8                 | 0.668         | 76.2                        | 120.3                               | 101.2                             | 11.481                                                         | From                                                                 | To (ksf)                                   |                         |
| Final                                   | 21.6                 | 0.585         | 100.2                       | 129.6                               | 106.5                             | NA                                                             | NA                                                                   | NA                                         |                         |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2321\_UD1a  
 Task No.: NA Date; Start: 3/25/2008 Initial Height,  $H_o$  (mm): 19.15  
 Project Name: Exelon (Victoria) Completed: 3/31/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6954  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.56724, V: 0.02218319 Piston Uplift,  $P_{up}$  (lbf): 34.67  
 Back Pressure,  $U_{b, CS}$  (psi): 70.56805, V: 0.02218345 Setup  $DT_{ref}$  (V): 0.04628201  
 Displacement Transducer No.: DT-102 Calib. Factor (mm/V): -212.321 Ch. No.: 4  
 Pore Press. Transducer No.: PT-110 Calib. Factor (psi/V): 3084.04 Ref. Zero (V): -0.000698 Ch. No.: 5  
 Force Cell No.: FT-106 Calib. Factor (lbf/V): 161475.386 Ref. Zero (V): 0.000153 Ch. No.: 6

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ), corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 85                    | 16 : 17 : 00         |                                                                    | 0.27                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 85                    | 16 : 28 : 00         |                                                                    | 0.65                                                        |                                                            | 0.041                                                         | 0.035                                                                 | 0.005                                                                   |                                                                              |
| BE                           | 86                    | 09 : 26 : 00         |                                                                    | 0.59                                                        | 0.000                                                      | 0.039                                                         | 0.032                                                                 | 0.007                                                                   |                                                                              |
| CS                           | 86                    | 09 : 27 : 00         | 0                                                                  | 0.62                                                        | 0.000                                                      | 0.040                                                         | 0.034                                                                 | 0.006                                                                   |                                                                              |
|                              | 86                    | 09 : 37 : 00         | 10                                                                 | 1.03                                                        | 0.000                                                      | 0.070                                                         | 0.056                                                                 | 0.014                                                                   | 0.248                                                                        |
|                              | 86                    | 09 : 47 : 00         | 20                                                                 | 1.29                                                        | -0.001                                                     | 0.109                                                         | 0.067                                                                 | 0.042                                                                   | 0.886                                                                        |
| US                           | 86                    | 09 : 57 : 00         | 30                                                                 | 1.61                                                        | -0.001                                                     | 0.166                                                         | 0.078                                                                 | 0.088                                                                   | 1.421                                                                        |
|                              | 86                    | 10 : 10 : 00         | 43                                                                 | 2.04                                                        | -0.001                                                     | 0.250                                                         | 0.091                                                                 | 0.159                                                                   | 1.708                                                                        |
|                              | 86                    | 10 : 30 : 00         | 63                                                                 | 2.73                                                        | -0.001                                                     | 0.378                                                         | 0.108                                                                 | 0.270                                                                   | 1.746                                                                        |
|                              | 86                    | 10 : 50 : 00         | 83                                                                 | 3.52                                                        | 0.000                                                      | 0.509                                                         | 0.123                                                                 | 0.387                                                                   | 1.825                                                                        |
|                              | 86                    | 11 : 10 : 00         | 103                                                                | 4.39                                                        | 0.000                                                      | 0.638                                                         | 0.137                                                                 | 0.502                                                                   | 1.803                                                                        |
|                              | 86                    | 11 : 30 : 00         | 123                                                                | 5.34                                                        | 0.004                                                      | 0.765                                                         | 0.149                                                                 | 0.616                                                                   | 1.791                                                                        |
|                              | 86                    | 11 : 50 : 00         | 143                                                                | 6.38                                                        | 0.009                                                      | 0.896                                                         | 0.162                                                                 | 0.734                                                                   | 1.855                                                                        |
|                              | 86                    | 12 : 10 : 00         | 163                                                                | 7.48                                                        | 0.028                                                      | 1.020                                                         | 0.173                                                                 | 0.846                                                                   | 1.751                                                                        |
|                              | 86                    | 12 : 30 : 00         | 183                                                                | 8.73                                                        | 0.076                                                      | 1.148                                                         | 0.185                                                                 | 0.962                                                                   | 1.820                                                                        |
|                              | 86                    | 12 : 50 : 00         | 203                                                                | 10.13                                                       | 0.182                                                      | 1.274                                                         | 0.197                                                                 | 1.076                                                                   | 1.781                                                                        |
|                              | 86                    | 13 : 10 : 00         | 223                                                                | 11.69                                                       | 0.390                                                      | 1.394                                                         | 0.210                                                                 | 1.184                                                                   | 1.687                                                                        |
|                              | 86                    | 13 : 30 : 00         | 243                                                                | 13.70                                                       | 0.891                                                      | 1.518                                                         | 0.225                                                                 | 1.294                                                                   | 1.722                                                                        |
|                              | 86                    | 13 : 50 : 00         | 263                                                                | 16.02                                                       | 1.646                                                      | 1.638                                                         | 0.240                                                                 | 1.398                                                                   | 1.632                                                                        |
|                              | 86                    | 14 : 10 : 00         | 283                                                                | 18.80                                                       | 2.792                                                      | 1.756                                                         | 0.257                                                                 | 1.499                                                                   | 1.584                                                                        |
|                              | 86                    | 14 : 30 : 00         | 303                                                                | 22.12                                                       | 4.449                                                      | 1.872                                                         | 0.276                                                                 | 1.596                                                                   | 1.517                                                                        |
|                              | 86                    | 14 : 50 : 00         | 323                                                                | 26.06                                                       | 6.667                                                      | 1.987                                                         | 0.297                                                                 | 1.690                                                                   | 1.468                                                                        |
| UE                           | 86                    | 15 : 10 : 00         | 343                                                                | 30.61                                                       | 9.456                                                      | 2.095                                                         | 0.320                                                                 | 1.775                                                                   | 1.343                                                                        |
|                              | 86                    | 15 : 30 : 00         | 363                                                                | 35.93                                                       | 12.948                                                     | 2.204                                                         | 0.344                                                                 | 1.861                                                                   | 1.338                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 86                    | 15 : 50 : 00         | 383                                                                | 41.93                                                       | 17.060                                                     | 2.311                                                         | 0.369                                                                 | 1.942                                                                   | 1.276                                                                        |
|                              | 86                    | 16 : 10 : 00         | 403                                                                | 48.56                                                       | 21.726                                                     | 2.414                                                         | 0.396                                                                 | 2.019                                                                   | 1.197                                                                        |
|                              | 86                    | 16 : 30 : 00         | 423                                                                | 55.88                                                       | 27.037                                                     | 2.517                                                         | 0.423                                                                 | 2.094                                                                   | 1.187                                                                        |
|                              | 86                    | 16 : 50 : 00         | 443                                                                | 63.68                                                       | 32.730                                                     | 2.616                                                         | 0.450                                                                 | 2.166                                                                   | 1.121                                                                        |
|                              | 86                    | 17 : 10 : 00         | 463                                                                | 72.08                                                       | 38.897                                                     | 2.714                                                         | 0.478                                                                 | 2.236                                                                   | 1.098                                                                        |
|                              | 86                    | 17 : 30 : 00         | 483                                                                | 81.09                                                       | 45.600                                                     | 2.812                                                         | 0.507                                                                 | 2.305                                                                   | 1.088                                                                        |
|                              | 86                    | 17 : 44 : 00         | 497                                                                | 87.65                                                       | 50.480                                                     | 2.879                                                         | 0.527                                                                 | 2.353                                                                   | 1.057                                                                        |
|                              | 86                    | 17 : 46 : 00         | 499                                                                | 86.45                                                       | 49.372                                                     | 2.884                                                         | 0.524                                                                 | 2.360                                                                   | 1.195                                                                        |
|                              | 86                    | 18 : 16 : 00         | 529                                                                | 69.41                                                       | 29.153                                                     | 2.905                                                         | 0.487                                                                 | 2.418                                                                   | 0.608                                                                        |
|                              | 86                    | 18 : 46 : 00         | 559                                                                | 53.30                                                       | 11.826                                                     | 2.884                                                         | 0.448                                                                 | 2.436                                                                   | 0.185                                                                        |
|                              | 86                    | 19 : 16 : 00         | 589                                                                | 41.43                                                       | 1.896                                                      | 2.853                                                         | 0.416                                                                 | 2.437                                                                   | 0.011                                                                        |
|                              | 86                    | 19 : 46 : 00         | 619                                                                | 32.83                                                       | -2.527                                                     | 2.819                                                         | 0.390                                                                 | 2.429                                                                   | -0.087                                                                       |
|                              | 86                    | 20 : 16 : 00         | 649                                                                | 25.12                                                       | -5.209                                                     | 2.779                                                         | 0.364                                                                 | 2.415                                                                   | -0.142                                                                       |
|                              | 86                    | 20 : 46 : 00         | 679                                                                | 18.71                                                       | -6.884                                                     | 2.732                                                         | 0.339                                                                 | 2.393                                                                   | -0.233                                                                       |
| US                           | 86                    | 21 : 16 : 00         | 709                                                                | 13.68                                                       | -7.856                                                     | 2.682                                                         | 0.317                                                                 | 2.365                                                                   | -0.291                                                                       |
|                              | 86                    | 21 : 46 : 00         | 739                                                                | 9.49                                                        | -8.386                                                     | 2.625                                                         | 0.294                                                                 | 2.332                                                                   | -0.347                                                                       |
|                              | 86                    | 22 : 16 : 00         | 769                                                                | 6.45                                                        | -8.545                                                     | 2.567                                                         | 0.272                                                                 | 2.295                                                                   | -0.387                                                                       |
| UE                           | 86                    | 22 : 46 : 00         | 799                                                                | 4.06                                                        | -8.610                                                     | 2.504                                                         | 0.249                                                                 | 2.255                                                                   | -0.419                                                                       |
|                              | 86                    | 23 : 16 : 00         | 829                                                                | 2.33                                                        | -8.615                                                     | 2.434                                                         | 0.223                                                                 | 2.211                                                                   | -0.456                                                                       |
|                              | 86                    | 23 : 46 : 00         | 859                                                                | 1.25                                                        | -8.533                                                     | 2.365                                                         | 0.195                                                                 | 2.171                                                                   | -0.422                                                                       |
|                              | 87                    | 00 : 16 : 00         | 889                                                                | 0.53                                                        | -8.419                                                     | 2.292                                                         | 0.157                                                                 | 2.135                                                                   | -0.368                                                                       |
|                              | 87                    | 01 : 22 : 00         | 955                                                                | 0.06                                                        | -7.980                                                     | 2.122                                                         | 0.117                                                                 | 2.005                                                                   | -0.616                                                                       |
|                              | 87                    | 01 : 28 : 00         | 961                                                                | 0.66                                                        | -7.888                                                     | 2.134                                                         | 0.166                                                                 | 1.969                                                                   | -1.923                                                                       |
|                              | 87                    | 01 : 32 : 00         | 965                                                                | 1.26                                                        | -7.783                                                     | 2.153                                                         | 0.195                                                                 | 1.958                                                                   | -0.830                                                                       |
|                              | 87                    | 01 : 40 : 00         | 973                                                                | 2.84                                                        | -7.483                                                     | 2.191                                                         | 0.232                                                                 | 1.959                                                                   | 0.020                                                                        |
|                              | 87                    | 01 : 44 : 00         | 977                                                                | 3.71                                                        | -7.286                                                     | 2.211                                                         | 0.245                                                                 | 1.966                                                                   | 0.548                                                                        |
|                              | 87                    | 02 : 00 : 00         | 993                                                                | 7.96                                                        | -6.090                                                     | 2.289                                                         | 0.284                                                                 | 2.005                                                                   | 0.781                                                                        |
| US                           | 87                    | 02 : 16 : 00         | 1009                                                               | 12.81                                                       | -3.937                                                     | 2.365                                                         | 0.312                                                                 | 2.053                                                                   | 0.922                                                                        |
|                              | 87                    | 02 : 32 : 00         | 1025                                                               | 18.43                                                       | -0.119                                                     | 2.437                                                         | 0.338                                                                 | 2.099                                                                   | 0.917                                                                        |
|                              | 87                    | 02 : 48 : 00         | 1041                                                               | 24.81                                                       | 5.677                                                      | 2.507                                                         | 0.363                                                                 | 2.145                                                                   | 0.886                                                                        |
|                              | 87                    | 03 : 04 : 00         | 1057                                                               | 32.25                                                       | 12.711                                                     | 2.576                                                         | 0.388                                                                 | 2.188                                                                   | 0.851                                                                        |
|                              | 87                    | 03 : 20 : 00         | 1073                                                               | 40.63                                                       | 20.253                                                     | 2.645                                                         | 0.414                                                                 | 2.231                                                                   | 0.838                                                                        |
|                              | 87                    | 03 : 36 : 00         | 1089                                                               | 49.74                                                       | 27.781                                                     | 2.712                                                         | 0.439                                                                 | 2.273                                                                   | 0.822                                                                        |
|                              | 87                    | 03 : 52 : 00         | 1105                                                               | 59.22                                                       | 34.869                                                     | 2.777                                                         | 0.463                                                                 | 2.314                                                                   | 0.814                                                                        |
|                              | 87                    | 04 : 08 : 00         | 1121                                                               | 68.60                                                       | 41.263                                                     | 2.844                                                         | 0.485                                                                 | 2.359                                                                   | 0.871                                                                        |
|                              | 87                    | 04 : 24 : 00         | 1137                                                               | 78.28                                                       | 47.457                                                     | 2.912                                                         | 0.507                                                                 | 2.406                                                                   | 0.912                                                                        |
|                              | 87                    | 04 : 40 : 00         | 1153                                                               | 87.41                                                       | 52.891                                                     | 2.979                                                         | 0.526                                                                 | 2.453                                                                   | 0.934                                                                        |
|                              | 87                    | 04 : 56 : 00         | 1169                                                               | 96.93                                                       | 58.839                                                     | 3.048                                                         | 0.553                                                                 | 2.494                                                                   | 0.801                                                                        |
|                              | 87                    | 05 : 12 : 00         | 1185                                                               | 105.99                                                      | 64.637                                                     | 3.117                                                         | 0.579                                                                 | 2.538                                                                   | 0.864                                                                        |
|                              | 87                    | 05 : 28 : 00         | 1201                                                               | 114.28                                                      | 69.830                                                     | 3.183                                                         | 0.601                                                                 | 2.582                                                                   | 0.866                                                                        |
|                              | 87                    | 05 : 44 : 00         | 1217                                                               | 123.70                                                      | 76.308                                                     | 3.253                                                         | 0.625                                                                 | 2.628                                                                   | 0.891                                                                        |
| UE                           | 87                    | 06 : 00 : 00         | 1233                                                               | 131.54                                                      | 81.290                                                     | 3.317                                                         | 0.645                                                                 | 2.673                                                                   | 0.875                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 87                    | 06 : 16 : 00         | 1249                                                               | 139.88                                                      | 82.126                                                     | 3.388                                                         | 0.665                                                                 | 2.723                                                                   | 0.981                                                                        |
|                              | 87                    | 06 : 32 : 00         | 1265                                                               | 147.17                                                      | 82.471                                                     | 3.460                                                         | 0.682                                                                 | 2.778                                                                   | 1.088                                                                        |
|                              | 87                    | 08 : 02 : 00         | 1355                                                               | 130.01                                                      | 55.004                                                     | 3.525                                                         | 0.653                                                                 | 2.872                                                                   | 0.326                                                                        |
|                              | 87                    | 09 : 42 : 00         | 1455                                                               | 111.55                                                      | 27.108                                                     | 3.551                                                         | 0.621                                                                 | 2.930                                                                   | 0.183                                                                        |
|                              | 87                    | 10 : 18 : 00         | 1491                                                               | 128.96                                                      | 39.744                                                     | 3.631                                                         | 0.652                                                                 | 2.979                                                                   | 0.423                                                                        |
|                              | 87                    | 11 : 08 : 00         | 1541                                                               | 160.26                                                      | 64.437                                                     | 3.789                                                         | 0.712                                                                 | 3.077                                                                   | 0.616                                                                        |
|                              | 87                    | 11 : 24 : 00         | 1557                                                               | 172.86                                                      | 74.432                                                     | 3.843                                                         | 0.740                                                                 | 3.103                                                                   | 0.502                                                                        |
|                              | 87                    | 11 : 40 : 00         | 1573                                                               | 184.33                                                      | 83.265                                                     | 3.898                                                         | 0.764                                                                 | 3.133                                                                   | 0.594                                                                        |
|                              | 87                    | 11 : 56 : 00         | 1589                                                               | 195.77                                                      | 87.485                                                     | 3.955                                                         | 0.788                                                                 | 3.167                                                                   | 0.663                                                                        |
|                              | 87                    | 12 : 10 : 00         | 1603                                                               | 205.28                                                      | 86.880                                                     | 4.011                                                         | 0.807                                                                 | 3.204                                                                   | 0.832                                                                        |
|                              | 87                    | 12 : 12 : 00         | 1605                                                               | 204.33                                                      | 86.561                                                     | 4.015                                                         | 0.806                                                                 | 3.209                                                                   | 0.828                                                                        |
|                              | 87                    | 13 : 22 : 00         | 1675                                                               | 176.28                                                      | 57.263                                                     | 4.048                                                         | 0.766                                                                 | 3.282                                                                   | 0.325                                                                        |
|                              | 87                    | 14 : 32 : 00         | 1745                                                               | 136.58                                                      | 13.991                                                     | 3.990                                                         | 0.703                                                                 | 3.287                                                                   | 0.025                                                                        |
|                              | 87                    | 15 : 42 : 00         | 1815                                                               | 103.74                                                      | -5.401                                                     | 3.918                                                         | 0.644                                                                 | 3.274                                                                   | -0.060                                                                       |
|                              | 87                    | 16 : 52 : 00         | 1885                                                               | 74.75                                                       | -7.463                                                     | 3.829                                                         | 0.584                                                                 | 3.244                                                                   | -0.134                                                                       |
|                              | 87                    | 18 : 02 : 00         | 1955                                                               | 51.24                                                       | -8.219                                                     | 3.730                                                         | 0.528                                                                 | 3.202                                                                   | -0.189                                                                       |
|                              | 87                    | 19 : 12 : 00         | 2025                                                               | 33.52                                                       | -8.472                                                     | 3.624                                                         | 0.478                                                                 | 3.147                                                                   | -0.247                                                                       |
| US                           | 87                    | 20 : 22 : 00         | 2095                                                               | 20.09                                                       | -8.659                                                     | 3.501                                                         | 0.430                                                                 | 3.071                                                                   | -0.341                                                                       |
|                              | 87                    | 21 : 32 : 00         | 2165                                                               | 10.78                                                       | -8.914                                                     | 3.366                                                         | 0.387                                                                 | 2.979                                                                   | -0.409                                                                       |
|                              | 87                    | 22 : 42 : 00         | 2235                                                               | 5.19                                                        | -9.189                                                     | 3.223                                                         | 0.347                                                                 | 2.876                                                                   | -0.462                                                                       |
|                              | 87                    | 23 : 52 : 00         | 2305                                                               | 1.73                                                        | -9.437                                                     | 3.065                                                         | 0.295                                                                 | 2.770                                                                   | -0.476                                                                       |
| UE                           | 88                    | 01 : 02 : 00         | 2375                                                               | 0.32                                                        | -9.581                                                     | 2.891                                                         | 0.295                                                                 | 2.596                                                                   | -0.777                                                                       |
|                              | 88                    | 02 : 12 : 00         | 2445                                                               | 0.06                                                        | -9.633                                                     | 2.704                                                         | 0.295                                                                 | 2.409                                                                   | -0.840                                                                       |
|                              | 88                    | 02 : 46 : 00         | 2479                                                               | 0.05                                                        | -9.637                                                     | 2.612                                                         | 0.295                                                                 | 2.317                                                                   | -0.848                                                                       |
|                              |                       | : :                  |                                                                    |                                                             |                                                            |                                                               |                                                                       |                                                                         |                                                                              |
|                              |                       | : :                  |                                                                    |                                                             |                                                            |                                                               |                                                                       |                                                                         |                                                                              |
|                              |                       | : :                  |                                                                    |                                                             |                                                            |                                                               |                                                                       |                                                                         |                                                                              |
|                              |                       | : :                  |                                                                    |                                                             |                                                            |                                                               |                                                                       |                                                                         |                                                                              |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-2 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD1  
 Task No.: NA Date; Start: 3/25/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.6 Piston Uplift,  $P_{up}$  (lbf): 34.67  
 Project Name: Exelon (Victoria) Completed: 3/31/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Dark Gray Sandy Lean CLAY (CL)

Ring No.: 2 Area,  $A_r$  (cm<sup>2</sup>): 31.695 Solids Ht.,  $H_s$  (mm): 11.481 Specific Gravity,  $G_s =$  2.710 ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.15 Water 18.8 Void 0.668 Deg. of 76.2 Total Unit 120.3 Dry Unit 101.2  
**Final:** (mm):  $H_f$ : 18.20 Content,  $w$  (%): 21.6 Ratio,  $e$ : 0.585 Sat.,  $S$  (%): 100.2 Weight,  $\gamma_t$  (pcf): 129.6 Weight,  $\gamma_d$  (pcf): 106.5

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP HP

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$C_v \cdot t_n \cdot UCF$<br>$T_v \cdot (H_{c,avg})^2$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                  |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                             |                                    | 0.27                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                  |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.03                                                                                                                        | 0.667                              | 0.65                                                    |                                                                |                                                                                         | 19.145                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                  |                                                                                                       |
| BE                           |                                                                          | 0.59                                                                    | 0.04                                                                                                                        | 0.667                              | 0.59                                                    | 0.000                                                          | 0.0                                                                                     | 19.143                                                |                                                                           |                                                                     | 0.667                                  |                                                   |                                                                                                  |                                                                                                       |
| CS                           | 0                                                                        | 0.62                                                                    | 0.03                                                                                                                        | 0.667                              | 0.62                                                    | 0.000                                                          | 0.0                                                                                     | 19.144                                                |                                                                           |                                                                     | 0.667                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 10                                                                       | 1.03                                                                    | 0.07                                                                                                                        | 0.667                              | 1.03                                                    | 0.000                                                          | 0.0                                                                                     | 19.136                                                | 0.82                                                                      |                                                                     | 0.667                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 20                                                                       | 1.29                                                                    | 0.22                                                                                                                        | 0.664                              | 1.29                                                    | -0.001                                                         | 0.0                                                                                     | 19.108                                                | 1.16                                                                      |                                                                     | 0.665                                  |                                                   |                                                                                                  |                                                                                                       |
| US                           | 30                                                                       | 1.61                                                                    | 0.46                                                                                                                        | 0.660                              | 1.61                                                    | -0.001                                                         | -0.1                                                                                    | 19.062                                                | 1.45                                                                      |                                                                     | 0.662                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 43                                                                       | 2.04                                                                    | 0.83                                                                                                                        | 0.654                              | 2.04                                                    | -0.001                                                         | -0.1                                                                                    | 18.991                                                | 1.82                                                                      |                                                                     | 0.657                                  |                                                   | -398.18                                                                                          |                                                                                                       |
|                              | 63                                                                       | 2.73                                                                    | 1.41                                                                                                                        | 0.644                              | 2.73                                                    | -0.001                                                         | 0.0                                                                                     | 18.880                                                | 2.38                                                                      |                                                                     | 0.649                                  |                                                   | -1162.35                                                                                         |                                                                                                       |
|                              | 83                                                                       | 3.52                                                                    | 2.02                                                                                                                        | 0.634                              | 3.52                                                    | 0.000                                                          | 0.0                                                                                     | 18.763                                                | 3.12                                                                      |                                                                     | 0.639                                  |                                                   | -4563.39                                                                                         |                                                                                                       |
|                              | 103                                                                      | 4.39                                                                    | 2.62                                                                                                                        | 0.624                              | 4.39                                                    | 0.000                                                          | 0.0                                                                                     | 18.648                                                | 3.96                                                                      |                                                                     | 0.629                                  |                                                   | -10252.41                                                                                        |                                                                                                       |
|                              | 123                                                                      | 5.34                                                                    | 3.22                                                                                                                        | 0.614                              | 5.34                                                    | 0.004                                                          | 0.1                                                                                     | 18.534                                                | 4.87                                                                      | 2644.50                                                             | 0.619                                  | 3.39E+00                                          | 2707.65                                                                                          |                                                                                                       |
|                              | 143                                                                      | 6.38                                                                    | 3.84                                                                                                                        | 0.604                              | 6.38                                                    | 0.009                                                          | 0.1                                                                                     | 18.416                                                | 5.86                                                                      | 761.04                                                              | 0.609                                  | 9.23E-01                                          | 958.75                                                                                           |                                                                                                       |
|                              | 163                                                                      | 7.46                                                                    | 4.42                                                                                                                        | 0.594                              | 7.48                                                    | 0.028                                                          | 0.4                                                                                     | 18.304                                                | 6.92                                                                      | 267.85                                                              | 0.599                                  | 2.90E-01                                          | 402.15                                                                                           |                                                                                                       |
|                              | 183                                                                      | 8.68                                                                    | 5.03                                                                                                                        | 0.584                              | 8.73                                                    | 0.076                                                          | 0.9                                                                                     | 18.188                                                | 8.07                                                                      | 105.25                                                              | 0.589                                  | 1.04E-01                                          | 184.07                                                                                           |                                                                                                       |
|                              | 203                                                                      | 10.01                                                                   | 5.62                                                                                                                        | 0.574                              | 10.13                                                   | 0.182                                                          | 1.8                                                                                     | 18.074                                                | 9.35                                                                      | 46.56                                                               | 0.579                                  | 4.07E-02                                          | 93.25                                                                                            |                                                                                                       |
|                              | 223                                                                      | 11.43                                                                   | 6.18                                                                                                                        | 0.565                              | 11.69                                                   | 0.390                                                          | 3.3                                                                                     | 17.966                                                | 10.72                                                                     | 23.06                                                               | 0.570                                  | 1.72E-02                                          | 52.15                                                                                            |                                                                                                       |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
|                              | 243                                                                      | 13.10                                                                   | 6.76                                                                                                                        | 0.555                              | 13.70                                                   | 0.891                                                          | 6.5                                                                                     | 17.856                                                | 12.27                                                                     | 12.89                                                               | 0.560                                  | 7.78E-03                                          | 32.57                                                                                               |                                                                                                       |
|                              | 263                                                                      | 14.90                                                                   | 7.30                                                                                                                        | 0.546                              | 16.02                                                   | 1.646                                                          | 10.3                                                                                    | 17.752                                                | 14.00                                                                     | 7.30                                                                | 0.551                                  | 3.70E-03                                          | 20.42                                                                                               |                                                                                                       |
|                              | 283                                                                      | 16.89                                                                   | 7.83                                                                                                                        | 0.537                              | 18.80                                                   | 2.792                                                          | 14.8                                                                                    | 17.651                                                | 15.90                                                                     | 4.84                                                                | 0.542                                  | 2.05E-03                                          | 14.88                                                                                               |                                                                                                       |
|                              | 303                                                                      | 19.05                                                                   | 8.33                                                                                                                        | 0.529                              | 22.12                                                   | 4.449                                                          | 20.1                                                                                    | 17.554                                                | 17.97                                                                     | 3.40                                                                | 0.533                                  | 1.20E-03                                          | 11.40                                                                                               |                                                                                                       |
|                              | 323                                                                      | 21.40                                                                   | 8.82                                                                                                                        | 0.521                              | 26.06                                                   | 6.667                                                          | 25.6                                                                                    | 17.460                                                | 20.22                                                                     | 2.51                                                                | 0.525                                  | 7.59E-04                                          | 9.14                                                                                                |                                                                                                       |
| UE                           | 343                                                                      | 23.93                                                                   | 9.27                                                                                                                        | 0.513                              | 30.61                                                   | 9.456                                                          | 30.9                                                                                    | 17.375                                                | 22.67                                                                     | 1.92                                                                | 0.517                                  | 4.80E-04                                          | 7.53                                                                                                |                                                                                                       |
|                              | 363                                                                      | 26.68                                                                   | 9.72                                                                                                                        | 0.506                              | 35.93                                                   | 12.948                                                         | 36.0                                                                                    | 17.289                                                | 25.30                                                                     |                                                                     | 0.510                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 383                                                                      | 29.60                                                                   | 10.14                                                                                                                       | 0.499                              | 41.93                                                   | 17.060                                                         | 40.7                                                                                    | 17.208                                                | 28.14                                                                     |                                                                     | 0.502                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 403                                                                      | 32.70                                                                   | 10.54                                                                                                                       | 0.492                              | 48.56                                                   | 21.726                                                         | 44.7                                                                                    | 17.131                                                | 31.15                                                                     |                                                                     | 0.495                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 423                                                                      | 35.96                                                                   | 10.94                                                                                                                       | 0.486                              | 55.88                                                   | 27.037                                                         | 48.4                                                                                    | 17.056                                                | 34.33                                                                     |                                                                     | 0.489                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 443                                                                      | 39.37                                                                   | 11.31                                                                                                                       | 0.479                              | 63.68                                                   | 32.730                                                         | 51.4                                                                                    | 16.984                                                | 37.66                                                                     |                                                                     | 0.482                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 463                                                                      | 42.97                                                                   | 11.68                                                                                                                       | 0.473                              | 72.08                                                   | 38.897                                                         | 54.0                                                                                    | 16.914                                                | 41.17                                                                     |                                                                     | 0.476                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 483                                                                      | 46.75                                                                   | 12.04                                                                                                                       | 0.467                              | 81.09                                                   | 45.600                                                         | 56.2                                                                                    | 16.845                                                | 44.86                                                                     |                                                                     | 0.470                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 497                                                                      | 49.48                                                                   | 12.28                                                                                                                       | 0.463                              | 87.65                                                   | 50.480                                                         | 57.6                                                                                    | 16.797                                                | 48.11                                                                     |                                                                     | 0.465                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 499                                                                      | 49.16                                                                   | 12.32                                                                                                                       | 0.462                              | 86.45                                                   | 49.372                                                         | 57.1                                                                                    | 16.790                                                | 49.32                                                                     |                                                                     | 0.463                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 529                                                                      | 48.27                                                                   | 12.63                                                                                                                       | 0.457                              | 69.41                                                   | 29.153                                                         | 42.0                                                                                    | 16.732                                                | 48.72                                                                     |                                                                     | 0.460                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 559                                                                      | 45.09                                                                   | 12.72                                                                                                                       | 0.456                              | 53.30                                                   | 11.826                                                         | 22.2                                                                                    | 16.714                                                | 46.68                                                                     |                                                                     | 0.457                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 589                                                                      | 40.16                                                                   | 12.73                                                                                                                       | 0.456                              | 41.43                                                   | 1.896                                                          | 4.6                                                                                     | 16.713                                                | 42.62                                                                     |                                                                     | 0.456                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 619                                                                      | 34.49                                                                   | 12.68                                                                                                                       | 0.456                              | 32.83                                                   | -2.527                                                         | -7.7                                                                                    | 16.721                                                | 37.32                                                                     |                                                                     | 0.456                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 649                                                                      | 28.49                                                                   | 12.61                                                                                                                       | 0.458                              | 25.12                                                   | -5.209                                                         | -20.7                                                                                   | 16.735                                                | 31.49                                                                     |                                                                     | 0.457                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 679                                                                      | 23.06                                                                   | 12.50                                                                                                                       | 0.460                              | 18.71                                                   | -6.884                                                         | -36.8                                                                                   | 16.757                                                | 25.77                                                                     |                                                                     | 0.459                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 709                                                                      | 18.52                                                                   | 12.35                                                                                                                       | 0.462                              | 13.68                                                   | -7.856                                                         | -57.4                                                                                   | 16.785                                                | 20.79                                                                     |                                                                     | 0.461                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 739                                                                      | 14.47                                                                   | 12.18                                                                                                                       | 0.465                              | 9.49                                                    | -8.386                                                         | -88.4                                                                                   | 16.818                                                | 16.50                                                                     |                                                                     | 0.463                                  |                                                   | 0.69                                                                                                |                                                                                                       |
|                              | 769                                                                      | 11.32                                                                   | 11.98                                                                                                                       | 0.468                              | 6.45                                                    | -8.545                                                         | -132.5                                                                                  | 16.855                                                | 12.90                                                                     | 1.33                                                                | 0.466                                  | 1.05E-04                                          | 1.07                                                                                                |                                                                                                       |
| UE                           | 799                                                                      | 8.67                                                                    | 11.77                                                                                                                       | 0.472                              | 4.06                                                    | -8.610                                                         | -212.0                                                                                  | 16.895                                                | 9.99                                                                      | 1.19                                                                | 0.470                                  | 1.10E-04                                          | 1.43                                                                                                |                                                                                                       |
|                              | 829                                                                      | 6.54                                                                    | 11.55                                                                                                                       | 0.475                              | 2.33                                                    | -8.615                                                         | -369.7                                                                                  | 16.939                                                | 7.60                                                                      |                                                                     | 0.473                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 859                                                                      | 4.93                                                                    | 11.33                                                                                                                       | 0.479                              | 1.25                                                    | -8.533                                                         | -680.5                                                                                  | 16.979                                                | 5.73                                                                      |                                                                     | 0.477                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 889                                                                      | 3.49                                                                    | 11.15                                                                                                                       | 0.482                              | 0.53                                                    | -8.419                                                         | -1586.4                                                                                 | 17.015                                                | 4.21                                                                      |                                                                     | 0.480                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 955                                                                      | 1.60                                                                    | 10.47                                                                                                                       | 0.493                              | 0.06                                                    | -7.980                                                         | -12686.9                                                                                | 17.145                                                | 2.54                                                                      |                                                                     | 0.488                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 961                                                                      | 3.63                                                                    | 10.28                                                                                                                       | 0.496                              | 0.66                                                    | -7.888                                                         | -1202.1                                                                                 | 17.181                                                | 2.61                                                                      |                                                                     | 0.495                                  |                                                   |                                                                                                     |                                                                                                       |

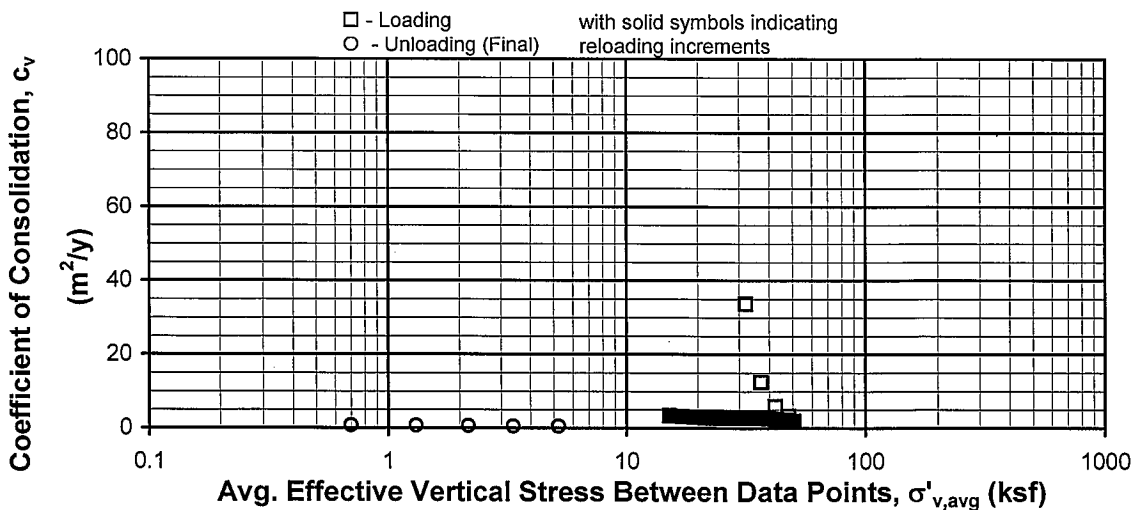
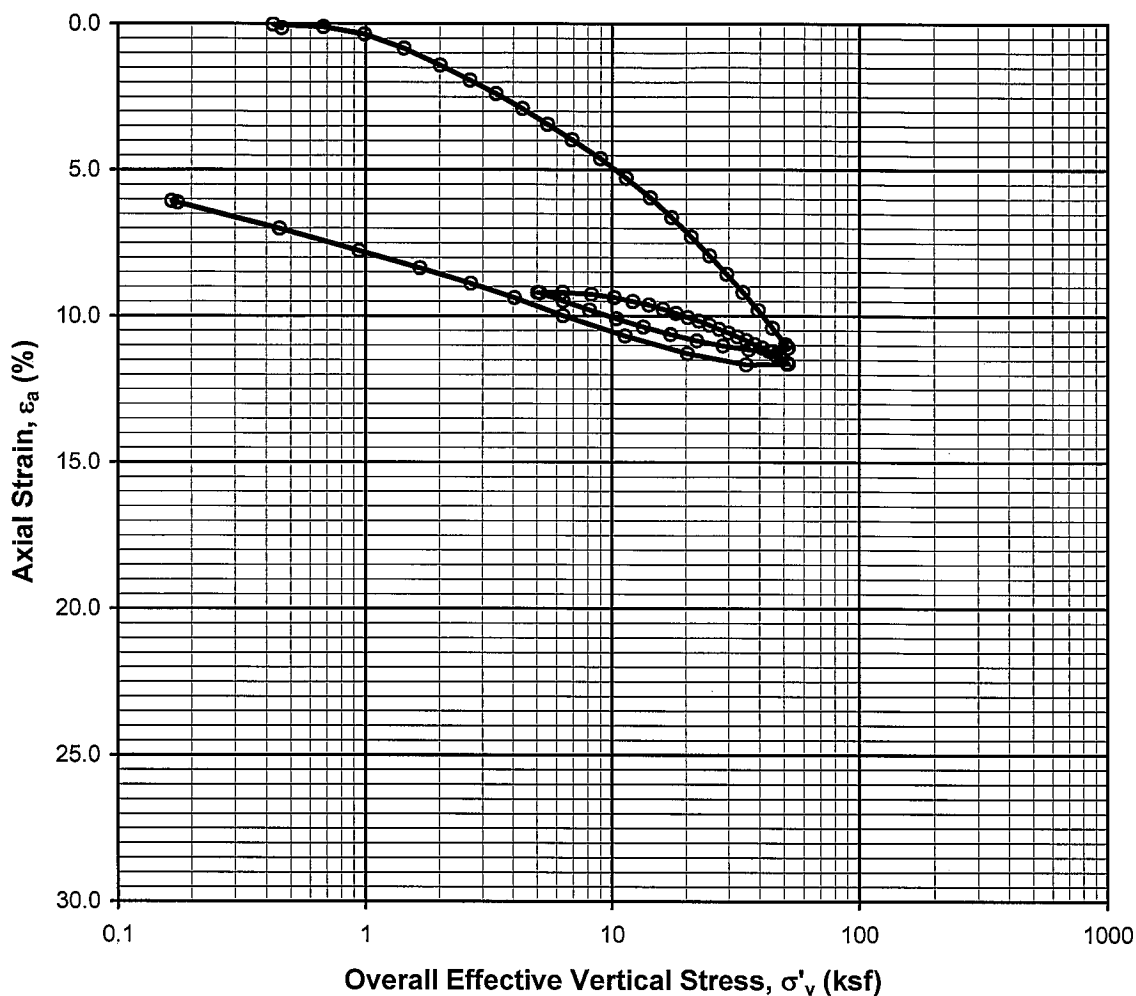


# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 965                                                                      | 4.68                                                                    | 10.22                                                                                                                       | 0.497                              | 1.26                                                    | -7.783                                                         | -619.7                                                                                  | 17.192                                                | 4.16                                                                      |                                                             | 0.497                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 973                                                                      | 6.71                                                                    | 10.23                                                                                                                       | 0.497                              | 2.84                                                    | -7.483                                                         | -263.7                                                                                  | 17.191                                                | 5.70                                                                      |                                                             | 0.497                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 977                                                                      | 7.66                                                                    | 10.26                                                                                                                       | 0.497                              | 3.71                                                    | -7.286                                                         | -196.3                                                                                  | 17.184                                                | 7.18                                                                      |                                                             | 0.497                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 993                                                                      | 11.63                                                                   | 10.47                                                                                                                       | 0.493                              | 7.96                                                    | -6.090                                                         | -76.5                                                                                   | 17.145                                                | 9.64                                                                      |                                                             | 0.495                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 1009                                                                     | 15.31                                                                   | 10.72                                                                                                                       | 0.489                              | 12.81                                                   | -3.937                                                         | -30.7                                                                                   | 17.097                                                | 13.47                                                                     |                                                             | 0.491                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1025                                                                     | 18.51                                                                   | 10.96                                                                                                                       | 0.485                              | 18.43                                                   | -0.119                                                         | -0.6                                                                                    | 17.051                                                | 16.91                                                                     |                                                             | 0.487                                  |                                                   | -2.98                                                                                          |                                                                                                        |
|                              | 1041                                                                     | 20.86                                                                   | 11.20                                                                                                                       | 0.481                              | 24.81                                                   | 5.677                                                          | 22.9                                                                                    | 17.005                                                | 19.69                                                                     | 10.28                                                       | 0.483                                  | 8.48E-04                                          | 4.32                                                                                           |                                                                                                        |
|                              | 1057                                                                     | 23.10                                                                   | 11.43                                                                                                                       | 0.477                              | 32.25                                                   | 12.711                                                         | 39.4                                                                                    | 16.962                                                | 21.98                                                                     | 3.20                                                        | 0.479                                  | 2.57E-04                                          | 2.02                                                                                           |                                                                                                        |
|                              | 1073                                                                     | 25.64                                                                   | 11.65                                                                                                                       | 0.474                              | 40.63                                                   | 20.253                                                         | 49.8                                                                                    | 16.919                                                | 24.37                                                                     | 1.81                                                        | 0.475                                  | 1.47E-04                                          | 1.53                                                                                           |                                                                                                        |
|                              | 1089                                                                     | 28.84                                                                   | 11.87                                                                                                                       | 0.470                              | 49.74                                                   | 27.781                                                         | 55.9                                                                                    | 16.877                                                | 27.24                                                                     | 1.25                                                        | 0.472                                  | 1.02E-04                                          | 1.33                                                                                           |                                                                                                        |
|                              | 1105                                                                     | 32.75                                                                   | 12.09                                                                                                                       | 0.466                              | 59.22                                                   | 34.869                                                         | 58.9                                                                                    | 16.836                                                | 30.79                                                                     | 0.95                                                        | 0.468                                  | 7.85E-05                                          | 1.22                                                                                           |                                                                                                        |
|                              | 1121                                                                     | 37.15                                                                   | 12.32                                                                                                                       | 0.462                              | 68.60                                                   | 41.263                                                         | 60.1                                                                                    | 16.791                                                | 34.95                                                                     | 0.75                                                        | 0.464                                  | 6.96E-05                                          | 1.14                                                                                           |                                                                                                        |
|                              | 1137                                                                     | 42.05                                                                   | 12.56                                                                                                                       | 0.458                              | 78.28                                                   | 47.457                                                         | 60.6                                                                                    | 16.744                                                | 39.60                                                                     | 0.66                                                        | 0.460                                  | 6.25E-05                                          | 1.14                                                                                           |                                                                                                        |
|                              | 1153                                                                     | 47.05                                                                   | 12.81                                                                                                                       | 0.454                              | 87.41                                                   | 52.891                                                         | 60.5                                                                                    | 16.697                                                | 44.55                                                                     | 0.54                                                        | 0.456                                  | 5.63E-05                                          | 1.07                                                                                           |                                                                                                        |
|                              | 1169                                                                     | 52.01                                                                   | 13.02                                                                                                                       | 0.451                              | 96.93                                                   | 58.839                                                         | 60.7                                                                                    | 16.656                                                | 49.53                                                                     | 0.51                                                        | 0.452                                  | 4.32E-05                                          | 1.11                                                                                           |                                                                                                        |
|                              | 1185                                                                     | 56.59                                                                   | 13.25                                                                                                                       | 0.447                              | 105.99                                                  | 64.637                                                         | 61.0                                                                                    | 16.612                                                | 54.30                                                                     | 0.43                                                        | 0.449                                  | 4.20E-05                                          | 1.05                                                                                           |                                                                                                        |
|                              | 1201                                                                     | 60.90                                                                   | 13.49                                                                                                                       | 0.443                              | 114.28                                                  | 69.830                                                         | 61.1                                                                                    | 16.568                                                | 58.74                                                                     |                                                             | 0.445                                  |                                                   | 0.96                                                                                           |                                                                                                        |
|                              | 1217                                                                     | 65.25                                                                   | 13.72                                                                                                                       | 0.439                              | 123.70                                                  | 76.308                                                         | 61.7                                                                                    | 16.522                                                | 63.08                                                                     | 0.37                                                        | 0.441                                  | 3.63E-05                                          | 1.08                                                                                           |                                                                                                        |
| UE                           | 1233                                                                     | 69.26                                                                   | 13.96                                                                                                                       | 0.435                              | 131.54                                                  | 81.290                                                         | 61.8                                                                                    | 16.477                                                | 67.26                                                                     |                                                             | 0.437                                  |                                                   | 0.90                                                                                           |                                                                                                        |
|                              | 1249                                                                     | 77.56                                                                   | 14.22                                                                                                                       | 0.431                              | 139.88                                                  | 82.126                                                         | 58.7                                                                                    | 16.427                                                | 73.41                                                                     |                                                             | 0.433                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1265                                                                     | 85.08                                                                   | 14.51                                                                                                                       | 0.426                              | 147.17                                                  | 82.471                                                         | 56.0                                                                                    | 16.372                                                | 81.32                                                                     |                                                             | 0.428                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1355                                                                     | 90.10                                                                   | 15.00                                                                                                                       | 0.418                              | 130.01                                                  | 55.004                                                         | 42.3                                                                                    | 16.278                                                | 87.59                                                                     |                                                             | 0.422                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1455                                                                     | 92.65                                                                   | 15.30                                                                                                                       | 0.413                              | 111.55                                                  | 27.108                                                         | 24.3                                                                                    | 16.220                                                | 91.37                                                                     |                                                             | 0.415                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1491                                                                     | 100.88                                                                  | 15.56                                                                                                                       | 0.408                              | 128.96                                                  | 39.744                                                         | 30.8                                                                                    | 16.171                                                | 96.76                                                                     |                                                             | 0.411                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1541                                                                     | 113.74                                                                  | 16.07                                                                                                                       | 0.400                              | 160.26                                                  | 64.437                                                         | 40.2                                                                                    | 16.073                                                | 107.31                                                                    |                                                             | 0.404                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1557                                                                     | 118.76                                                                  | 16.20                                                                                                                       | 0.398                              | 172.86                                                  | 74.432                                                         | 43.1                                                                                    | 16.047                                                | 116.25                                                                    |                                                             | 0.399                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1573                                                                     | 123.48                                                                  | 16.36                                                                                                                       | 0.395                              | 184.33                                                  | 83.265                                                         | 45.2                                                                                    | 16.017                                                | 121.12                                                                    |                                                             | 0.396                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1589                                                                     | 131.92                                                                  | 16.54                                                                                                                       | 0.392                              | 195.77                                                  | 87.485                                                         | 44.7                                                                                    | 15.983                                                | 127.70                                                                    |                                                             | 0.394                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1603                                                                     | 142.24                                                                  | 16.73                                                                                                                       | 0.389                              | 205.28                                                  | 86.880                                                         | 42.3                                                                                    | 15.946                                                | 137.08                                                                    |                                                             | 0.390                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1605                                                                     | 141.52                                                                  | 16.76                                                                                                                       | 0.388                              | 204.33                                                  | 86.561                                                         | 42.4                                                                                    | 15.941                                                | 141.88                                                                    |                                                             | 0.389                                  |                                                   |                                                                                                |                                                                                                        |

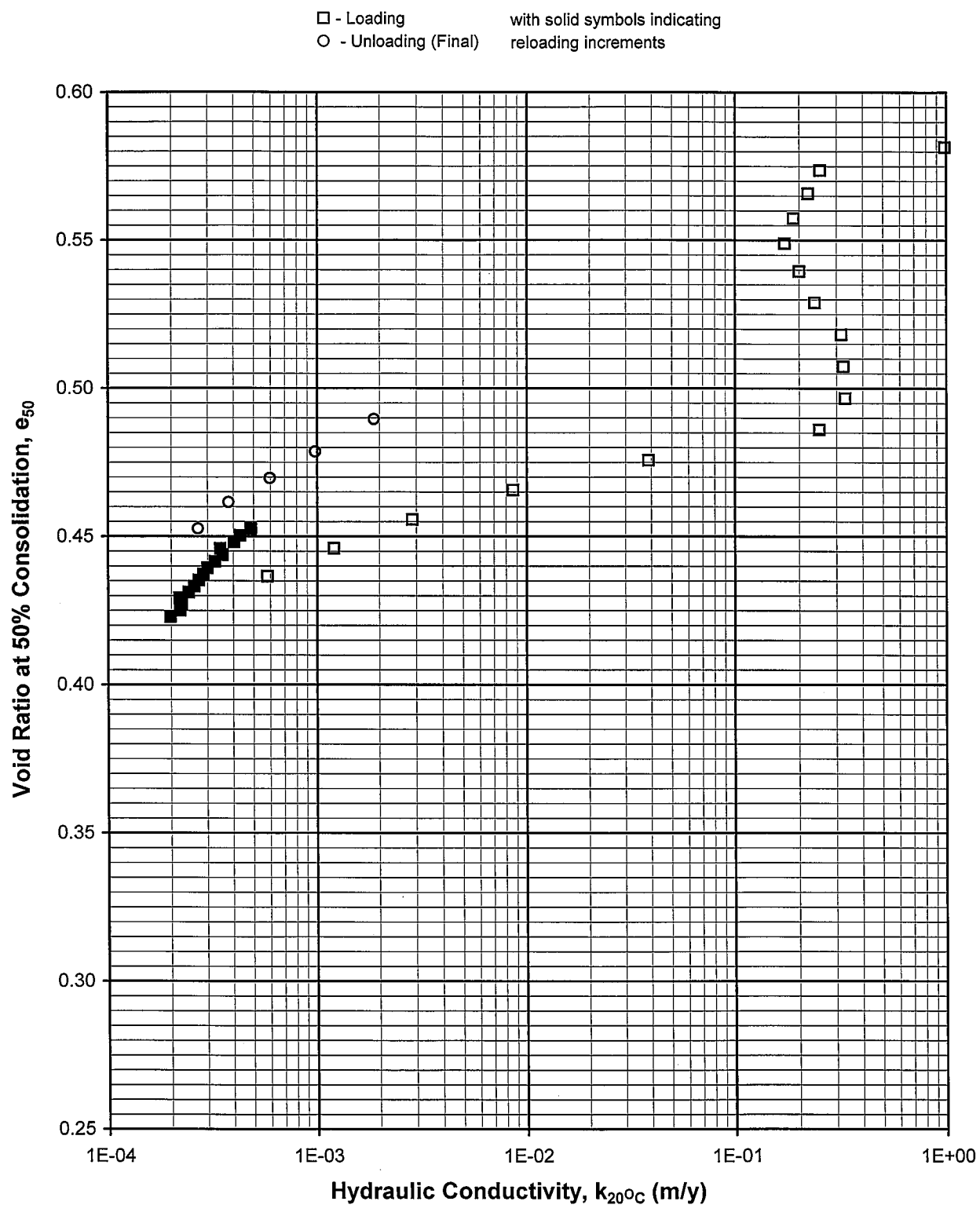
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 1675                                                                     | 135.67                                                                  | 17.14                                                                                                                       | 0.382                              | 176.28                                                  | 57.263                                                         | 32.5                                                                                    | 15.868                                                | 138.59                                                                    |                                                                     | 0.385                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1745                                                                     | 127.08                                                                  | 17.17                                                                                                                       | 0.382                              | 136.58                                                  | 13.991                                                         | 10.2                                                                                    | 15.863                                                | 131.38                                                                    |                                                                     | 0.382                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1815                                                                     | 107.31                                                                  | 17.10                                                                                                                       | 0.383                              | 103.74                                                  | -5.401                                                         | -5.2                                                                                    | 15.876                                                | 117.20                                                                    |                                                                     | 0.382                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1885                                                                     | 79.64                                                                   | 16.94                                                                                                                       | 0.385                              | 74.75                                                   | -7.463                                                         | -10.0                                                                                   | 15.906                                                | 93.48                                                                     |                                                                     | 0.384                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1955                                                                     | 56.58                                                                   | 16.72                                                                                                                       | 0.389                              | 51.24                                                   | -8.219                                                         | -16.0                                                                                   | 15.948                                                | 68.11                                                                     |                                                                     | 0.387                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2025                                                                     | 38.95                                                                   | 16.43                                                                                                                       | 0.394                              | 33.52                                                   | -8.472                                                         | -25.3                                                                                   | 16.003                                                | 47.77                                                                     |                                                                     | 0.391                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 2095                                                                     | 25.52                                                                   | 16.04                                                                                                                       | 0.400                              | 20.09                                                   | -8.659                                                         | -43.1                                                                                   | 16.079                                                | 32.23                                                                     |                                                                     | 0.397                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2165                                                                     | 16.11                                                                   | 15.56                                                                                                                       | 0.408                              | 10.78                                                   | -8.914                                                         | -82.7                                                                                   | 16.171                                                | 20.82                                                                     | 1.35                                                                | 0.404                                  | 1.01E-04                                          | 1.38                                                                                           |                                                                                                        |
|                              | 2235                                                                     | 10.23                                                                   | 15.02                                                                                                                       | 0.417                              | 5.19                                                    | -9.189                                                         | -177.1                                                                                  | 16.274                                                | 13.17                                                                     | 0.95                                                                | 0.413                                  | 1.09E-04                                          | 1.93                                                                                           |                                                                                                        |
|                              | 2305                                                                     | 5.99                                                                    | 14.46                                                                                                                       | 0.427                              | 1.73                                                    | -9.437                                                         | -546.7                                                                                  | 16.380                                                | 8.11                                                                      | 0.84                                                                | 0.422                                  | 1.07E-04                                          | 2.53                                                                                           |                                                                                                        |
| UE                           | 2375                                                                     | 3.15                                                                    | 13.56                                                                                                                       | 0.442                              | 0.32                                                    | -9.581                                                         | -2997.8                                                                                 | 16.554                                                | 4.57                                                                      | 0.74                                                                | 0.434                                  | 1.77E-04                                          | 2.89                                                                                           |                                                                                                        |
|                              | 2445                                                                     | 1.80                                                                    | 12.58                                                                                                                       | 0.458                              | 0.06                                                    | -9.633                                                         | -15405.0                                                                                | 16.741                                                | 2.48                                                                      |                                                                     | 0.450                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2479                                                                     | 1.67                                                                    | 12.10                                                                                                                       | 0.466                              | 0.05                                                    | -9.637                                                         | -19419.0                                                                                | 16.833                                                | 1.74                                                                      |                                                                     | 0.462                                  |                                                   |                                                                                                |                                                                                                        |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       |                                                                           |                                                                     |                                        |                                                   |                                                                                                |                                                                                                        |



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-3A - Depth 10.0 - 11.7 ft  
 Boring B-2321UD

KAW 7/16/08



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-3A - Depth 10.0 - 11.7 ft  
 Boring B-2321UD

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-4 File Name: B-2321\_UD3a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Meas. ; ☐ Assumed Ring No.: 4  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.755  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                 |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =              | No. Layers =            |
| Sample No.: UD-3                                   | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =             | Drop (in.) =            |
| Depth (ft): 10.0 - 11.7                            | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                   | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                  |                                | Mass Moist Soil + Ring (g)                           | 329.81  | 332.49 |
| Container No.                                            | 2002                        | 2005             | 5056                                        | 141                            | Mass Ring (g)                                        | 210.11  |        |
| Mass Moist Soil + Container (g)                          | 119.83                      | 129.37           | 111.41                                      | 71.16                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 119.70  | 122.38 |
| Mass Dry Soil + Container (g)                            | 107.58                      | 116.43           | 100.80                                      | 64.58                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 30.54                       | 30.54            | 30.41                                       | 30.60                          | Container No.                                        | 2017    |        |
| WATER CONTENT (%)                                        | 15.90                       | 15.07            | 15.07                                       | 19.36                          | Mass Dry Soil + Container (g)                        | 30.55   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 15.35                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> Slice ; | Whole Spec.                    | Mass Container (g)                                   | 30.47   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.08    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.070 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.170                                                                                                                                                                       | 0.000                                  | 12.820                                    | 13.820                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.142                                                              | 12.808 |
| 19.120                                                                                                                                                                       | 0.000                                  | 12.570                                    | 13.700                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.774 |
| 19.160                                                                                                                                                                       | 0.000                                  | 12.780                                    | 13.720                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.142                                                              | 18.104 |
| 19.110                                                                                                                                                                       | 0.000                                  | 13.040                                    | 13.790                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.150                                                                                                                                                                       | 0.000                                  | 12.830                                    | 13.840                      | Initial Height, $H_o$                                   |  | 19.142                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 18.104                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | -0.65                                                               |        |

| Estimated Initial Unit Weight                                                              |                                    | Soil Extruded During Loading                            |      |
|--------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 122.94                                                       | Dry, $\gamma_{d,o}$ (pcf) = 106.58 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54;                     | Other                              | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No  |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Very Pale Brown and Brownish Yellow Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/25/2008 Date: 3/25/2008 Final Calc. By: LF Date: 4/2/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/68

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-4 File Name: B-2321\_UD3a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 15.90                    | 103.28                   | 72.8                         | 99.1                  | 101.2 |
| 2                | " Bottom, W2          | 15.07                    | 104.03                   | 70.3                         | 96.6                  | 98.6  |
| 3                | " Sides, W3           | 15.07                    | 104.02                   | 70.3                         | 96.6                  | 98.7  |
| 4                | " Average, W4         | 15.35                    | 103.77                   | 71.2                         | 97.5                  | 99.5  |
| 5                | " Back Calculated (1) | 16.66                    | 102.61 (3)               | 74.9                         | 101.3                 | 103.4 |
| 6                | Final                 | 19.36                    | 102.61 (2)               | 74.9                         | 101.3                 | 103.4 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.728</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.719</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11641 |
| Final Selected, $K_f$                                                           | 0.11641 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>103.00</u>                                                                |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>102.80</u>                                         |  |                              |

| Summary of Specimen Physical Properties    |                            |                  |                                   |                                               |                                             |                                                                                          |                                                                              |                                                     |  |
|--------------------------------------------|----------------------------|------------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------|--|
| Specific Gravity<br>G <sub>s</sub> = 2.710 |                            |                  |                                   | Assumed                                       |                                             | To make S <sub>f</sub> = 100% at end of test.                                            |                                                                              |                                                     |  |
|                                            |                            |                  | X                                 | Measured                                      |                                             | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                                              |                                                     |  |
| Mass Dry<br>Soil, (g)                      | Initial: 102.61            |                  | X                                 | From Cal. Routine No.                         |                                             | 5                                                                                        | Note: Routine #5 is based on final measurements.                             |                                                     |  |
|                                            | Final (4): NA              |                  |                                   | Make S <sub>f</sub> = 100%, or;               |                                             |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%                                |                                                     |  |
| Initial Height (mm) = 19.14                |                            |                  |                                   | X                                             | Measured ;                                  |                                                                                          |                                                                              | Back Calculated Back-cal. Sat. (%) = NA             |  |
| Final Height (mm) = 18.10                  |                            |                  |                                   | X                                             | Measured ;                                  |                                                                                          |                                                                              | Initial H <sub>0</sub> & dial change during loading |  |
|                                            | Water<br>Content, w<br>(%) | Void Ratio,<br>e | Degree of<br>Saturation, S<br>(%) | Total Unit<br>Weight, γ <sub>t</sub><br>(pcf) | Dry Unit<br>Weight, γ <sub>d</sub><br>(pcf) | Height of<br>Solids, H <sub>s</sub> (2,4)<br>(mm)                                        | Extruded soil loss proportioned in<br>increasing loading increments (5)<br>: |                                                     |  |
| Initial                                    | 16.7                       | 0.603            | 74.9                              | 122.9                                         | 105.4                                       | 11.945                                                                                   | From                                                                         | To (ksf)                                            |  |
| Final                                      | 19.3                       | 0.516            | 101.3                             | 132.9                                         | 111.4                                       | NA                                                                                       | NA                                                                           | NA                                                  |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 51 | Minus 200 (%) |
| Casagrande Method      | 6.00              | NA                                | 0.102 | 0.025 | 4.2 | Plastic Limit (PL)    | 16 | 93.5          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 35 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP  
 Date: 4/4/2008

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

|                              |                                   |                        |                                                      |                                                    |                                |
|------------------------------|-----------------------------------|------------------------|------------------------------------------------------|----------------------------------------------------|--------------------------------|
| Project Number:              | 0411-08-1686                      | Test Station No.:      | CRS-4                                                | File Name:                                         | B-2321_UD3a                    |
| Task No.:                    | NA                                | Date; Start:           | 3/25/2008                                            | Initial Height, $H_o$ (mm):                        | 19.14                          |
| Project Name:                | Exelon (Victoria)                 | Completed:             | 4/2/2008                                             | Ring Area, $A_r$ (cm <sup>2</sup> ):               | 31.7546                        |
| Test: Initial / Pressure     | Gauge Back Pressure, $U_G$ (psi): | 70                     | <input checked="" type="checkbox"/> Undisturbed or ; | <input type="checkbox"/> Reconstituted - Specimen. |                                |
| Reference Values:            | Back Pressure, $U_{b,BE}$ (psi):  | 70.72298               | , V:                                                 | 0.02294669                                         | Piston Uplift, $P_{up}$ (lbf): |
|                              | Back Pressure, $U_{b,CS}$ (psi):  | 70.72316               | , V:                                                 | 0.02294675                                         | Setup $DT_{ref}$ (V):          |
| Displacement Transducer No.: | DT-104                            | Calib. Factor (mm/V):  | -214.04                                              | Ch. No.:                                           | 10                             |
| Pore Press. Transducer No.:  | PT-111                            | Calib. Factor (psi/V): | 3094.921                                             | Ref. Zero (V):                                     | 0.000095                       |
|                              |                                   |                        |                                                      | Ch. No.:                                           | 11                             |
| Force Cell No.:              | FT-104                            | Calib. Factor (lbf/V): | 96642.037                                            | Ref. Zero (V):                                     | -0.000039                      |
|                              |                                   |                        |                                                      | Ch. No.:                                           | 12                             |

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift)
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF      Reviewed By: HP 

Remarks:

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| S                            | 85                    | 15 : 39 : 00         |                                                                    | 0.30                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                 |
| BS                           | 85                    | 16 : 28 : 00         |                                                                    | 0.62                                                        |                                                            | 0.047                                                         | 0.020                                                                 | 0.027                                                                   |                                                                                 |
| BE                           | 86                    | 09 : 31 : 00         |                                                                    | 0.46                                                        | 0.000                                                      | 0.026                                                         | 0.000                                                                 | 0.026                                                                   |                                                                                 |
| CS                           | 86                    | 09 : 32 : 00         | 0                                                                  | 0.42                                                        | 0.000                                                      | 0.025                                                         | 0.020                                                                 | 0.005                                                                   |                                                                                 |
|                              | 86                    | 10 : 04 : 00         | 32                                                                 | 0.68                                                        | 0.000                                                      | 0.042                                                         | 0.021                                                                 | 0.021                                                                   | 0.155                                                                           |
|                              | 86                    | 10 : 36 : 00         | 64                                                                 | 0.99                                                        | 0.001                                                      | 0.099                                                         | 0.030                                                                 | 0.069                                                                   | 0.477                                                                           |
| US                           | 86                    | 11 : 28 : 00         | 116                                                                | 1.43                                                        | 0.000                                                      | 0.204                                                         | 0.043                                                                 | 0.161                                                                   | 0.555                                                                           |
|                              | 86                    | 12 : 32 : 00         | 180                                                                | 2.01                                                        | -0.002                                                     | 0.330                                                         | 0.058                                                                 | 0.273                                                                   | 0.545                                                                           |
|                              | 86                    | 13 : 36 : 00         | 244                                                                | 2.67                                                        | 0.005                                                      | 0.441                                                         | 0.071                                                                 | 0.370                                                                   | 0.476                                                                           |
|                              | 86                    | 14 : 40 : 00         | 308                                                                | 3.41                                                        | 0.006                                                      | 0.542                                                         | 0.083                                                                 | 0.459                                                                   | 0.436                                                                           |
|                              | 86                    | 15 : 44 : 00         | 372                                                                | 4.38                                                        | 0.008                                                      | 0.654                                                         | 0.097                                                                 | 0.558                                                                   | 0.483                                                                           |
|                              | 86                    | 16 : 48 : 00         | 436                                                                | 5.52                                                        | 0.008                                                      | 0.768                                                         | 0.110                                                                 | 0.658                                                                   | 0.494                                                                           |
|                              | 86                    | 17 : 52 : 00         | 500                                                                | 6.91                                                        | 0.009                                                      | 0.882                                                         | 0.123                                                                 | 0.759                                                                   | 0.492                                                                           |
|                              | 86                    | 18 : 56 : 00         | 564                                                                | 9.01                                                        | 0.009                                                      | 1.023                                                         | 0.140                                                                 | 0.883                                                                   | 0.608                                                                           |
|                              | 86                    | 20 : 00 : 00         | 628                                                                | 11.46                                                       | 0.007                                                      | 1.169                                                         | 0.157                                                                 | 1.011                                                                   | 0.630                                                                           |
|                              | 86                    | 21 : 04 : 00         | 692                                                                | 14.29                                                       | 0.005                                                      | 1.313                                                         | 0.175                                                                 | 1.138                                                                   | 0.622                                                                           |
|                              | 86                    | 22 : 08 : 00         | 756                                                                | 17.49                                                       | 0.007                                                      | 1.461                                                         | 0.193                                                                 | 1.267                                                                   | 0.632                                                                           |
|                              | 86                    | 23 : 12 : 00         | 820                                                                | 21.05                                                       | 0.004                                                      | 1.607                                                         | 0.212                                                                 | 1.395                                                                   | 0.625                                                                           |
|                              | 87                    | 00 : 16 : 00         | 884                                                                | 25.01                                                       | 0.010                                                      | 1.751                                                         | 0.231                                                                 | 1.519                                                                   | 0.609                                                                           |
|                              | 87                    | 01 : 20 : 00         | 948                                                                | 29.51                                                       | 0.075                                                      | 1.893                                                         | 0.252                                                                 | 1.640                                                                   | 0.593                                                                           |
|                              | 87                    | 02 : 24 : 00         | 1012                                                               | 34.49                                                       | 0.294                                                      | 2.034                                                         | 0.274                                                                 | 1.759                                                                   | 0.583                                                                           |
|                              | 87                    | 03 : 28 : 00         | 1076                                                               | 39.99                                                       | 0.788                                                      | 2.175                                                         | 0.298                                                                 | 1.877                                                                   | 0.578                                                                           |
|                              | 87                    | 04 : 32 : 00         | 1140                                                               | 46.09                                                       | 1.683                                                      | 2.314                                                         | 0.322                                                                 | 1.992                                                                   | 0.559                                                                           |
| UE                           | 87                    | 05 : 36 : 00         | 1204                                                               | 53.00                                                       | 3.189                                                      | 2.450                                                         | 0.349                                                                 | 2.101                                                                   | 0.536                                                                           |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 87                    | 05 : 48 : 00         | 1216                                                               | 54.41                                                       | 3.547                                                      | 2.476                                                         | 0.354                                                                 | 2.122                                                                   | 0.534                                                                        |
|                              | 87                    | 05 : 50 : 00         | 1218                                                               | 53.98                                                       | 3.279                                                      | 2.477                                                         | 0.353                                                                 | 2.124                                                                   | 0.351                                                                        |
|                              | 87                    | 07 : 04 : 00         | 1292                                                               | 45.22                                                       | -0.331                                                     | 2.469                                                         | 0.324                                                                 | 2.145                                                                   | 0.089                                                                        |
|                              | 87                    | 08 : 18 : 00         | 1366                                                               | 35.63                                                       | -0.850                                                     | 2.425                                                         | 0.291                                                                 | 2.135                                                                   | -0.042                                                                       |
|                              | 87                    | 09 : 32 : 00         | 1440                                                               | 27.67                                                       | -1.153                                                     | 2.372                                                         | 0.261                                                                 | 2.111                                                                   | -0.103                                                                       |
|                              | 87                    | 10 : 46 : 00         | 1514                                                               | 21.28                                                       | -1.408                                                     | 2.312                                                         | 0.236                                                                 | 2.076                                                                   | -0.147                                                                       |
|                              | 87                    | 12 : 00 : 00         | 1588                                                               | 16.25                                                       | -1.599                                                     | 2.249                                                         | 0.215                                                                 | 2.034                                                                   | -0.178                                                                       |
| US                           | 87                    | 13 : 14 : 00         | 1662                                                               | 12.35                                                       | -1.682                                                     | 2.183                                                         | 0.198                                                                 | 1.985                                                                   | -0.205                                                                       |
|                              | 87                    | 14 : 28 : 00         | 1736                                                               | 9.38                                                        | -1.648                                                     | 2.114                                                         | 0.182                                                                 | 1.932                                                                   | -0.228                                                                       |
|                              | 87                    | 15 : 42 : 00         | 1810                                                               | 7.15                                                        | -1.527                                                     | 2.044                                                         | 0.169                                                                 | 1.875                                                                   | -0.240                                                                       |
|                              | 87                    | 16 : 56 : 00         | 1884                                                               | 5.52                                                        | -1.342                                                     | 1.974                                                         | 0.158                                                                 | 1.816                                                                   | -0.250                                                                       |
|                              | 87                    | 18 : 08 : 00         | 1956                                                               | 4.48                                                        | -1.057                                                     | 1.913                                                         | 0.149                                                                 | 1.764                                                                   | -0.225                                                                       |
| UE                           | 87                    | 18 : 10 : 00         | 1958                                                               | 4.33                                                        | -1.129                                                     | 1.910                                                         | 0.147                                                                 | 1.763                                                                   | -0.250                                                                       |
|                              | 87                    | 18 : 28 : 00         | 1976                                                               | 6.45                                                        | 0.157                                                      | 1.924                                                         | 0.164                                                                 | 1.759                                                                   | -0.062                                                                       |
|                              | 87                    | 18 : 46 : 00         | 1994                                                               | 9.05                                                        | 1.113                                                      | 1.954                                                         | 0.180                                                                 | 1.773                                                                   | 0.246                                                                        |
|                              | 87                    | 19 : 04 : 00         | 2012                                                               | 11.39                                                       | 1.660                                                      | 1.987                                                         | 0.193                                                                 | 1.794                                                                   | 0.362                                                                        |
| US                           | 87                    | 19 : 22 : 00         | 2030                                                               | 13.62                                                       | 2.087                                                      | 2.021                                                         | 0.204                                                                 | 1.818                                                                   | 0.407                                                                        |
|                              | 87                    | 19 : 40 : 00         | 2048                                                               | 15.84                                                       | 2.468                                                      | 2.056                                                         | 0.214                                                                 | 1.843                                                                   | 0.434                                                                        |
|                              | 87                    | 19 : 58 : 00         | 2066                                                               | 18.03                                                       | 2.782                                                      | 2.092                                                         | 0.223                                                                 | 1.869                                                                   | 0.462                                                                        |
|                              | 87                    | 20 : 16 : 00         | 2084                                                               | 20.31                                                       | 3.064                                                      | 2.128                                                         | 0.232                                                                 | 1.895                                                                   | 0.459                                                                        |
|                              | 87                    | 20 : 34 : 00         | 2102                                                               | 22.64                                                       | 3.314                                                      | 2.164                                                         | 0.242                                                                 | 1.923                                                                   | 0.471                                                                        |
|                              | 87                    | 20 : 52 : 00         | 2120                                                               | 24.99                                                       | 3.482                                                      | 2.198                                                         | 0.251                                                                 | 1.947                                                                   | 0.432                                                                        |
|                              | 87                    | 21 : 10 : 00         | 2138                                                               | 27.49                                                       | 3.673                                                      | 2.235                                                         | 0.261                                                                 | 1.974                                                                   | 0.469                                                                        |
|                              | 87                    | 21 : 28 : 00         | 2156                                                               | 30.03                                                       | 3.823                                                      | 2.270                                                         | 0.270                                                                 | 2.000                                                                   | 0.452                                                                        |
|                              | 87                    | 21 : 46 : 00         | 2174                                                               | 32.65                                                       | 3.957                                                      | 2.305                                                         | 0.280                                                                 | 2.025                                                                   | 0.434                                                                        |
|                              | 87                    | 22 : 04 : 00         | 2192                                                               | 35.42                                                       | 4.124                                                      | 2.340                                                         | 0.290                                                                 | 2.050                                                                   | 0.432                                                                        |
|                              | 87                    | 22 : 22 : 00         | 2210                                                               | 38.21                                                       | 4.256                                                      | 2.374                                                         | 0.300                                                                 | 2.075                                                                   | 0.428                                                                        |
|                              | 87                    | 22 : 40 : 00         | 2228                                                               | 41.06                                                       | 4.408                                                      | 2.408                                                         | 0.310                                                                 | 2.099                                                                   | 0.421                                                                        |
|                              | 87                    | 22 : 58 : 00         | 2246                                                               | 44.03                                                       | 4.632                                                      | 2.443                                                         | 0.320                                                                 | 2.123                                                                   | 0.415                                                                        |
|                              | 87                    | 23 : 16 : 00         | 2264                                                               | 46.99                                                       | 4.874                                                      | 2.475                                                         | 0.330                                                                 | 2.145                                                                   | 0.396                                                                        |
|                              | 87                    | 23 : 34 : 00         | 2282                                                               | 49.89                                                       | 5.186                                                      | 2.510                                                         | 0.340                                                                 | 2.170                                                                   | 0.431                                                                        |
|                              | 87                    | 23 : 52 : 00         | 2300                                                               | 52.78                                                       | 5.574                                                      | 2.545                                                         | 0.349                                                                 | 2.196                                                                   | 0.453                                                                        |
| UE                           | 88                    | 00 : 10 : 00         | 2318                                                               | 55.54                                                       | 5.978                                                      | 2.580                                                         | 0.359                                                                 | 2.221                                                                   | 0.439                                                                        |
|                              | 88                    | 00 : 14 : 00         | 2322                                                               | 56.16                                                       | 6.085                                                      | 2.588                                                         | 0.361                                                                 | 2.227                                                                   | 0.447                                                                        |
|                              | 88                    | 00 : 16 : 00         | 2324                                                               | 55.78                                                       | 5.800                                                      | 2.589                                                         | 0.360                                                                 | 2.230                                                                   | 0.400                                                                        |
|                              | 88                    | 03 : 10 : 00         | 2498                                                               | 34.32                                                       | -1.535                                                     | 2.519                                                         | 0.287                                                                 | 2.232                                                                   | 0.005                                                                        |
|                              | 88                    | 06 : 04 : 00         | 2672                                                               | 18.52                                                       | -2.748                                                     | 2.385                                                         | 0.226                                                                 | 2.159                                                                   | -0.131                                                                       |
|                              | 88                    | 08 : 58 : 00         | 2846                                                               | 9.37                                                        | -3.080                                                     | 2.228                                                         | 0.183                                                                 | 2.045                                                                   | -0.207                                                                       |
| US                           | 88                    | 11 : 52 : 00         | 3020                                                               | 4.85                                                        | -2.454                                                     | 2.065                                                         | 0.153                                                                 | 1.912                                                                   | -0.239                                                                       |
|                              | 88                    | 14 : 46 : 00         | 3194                                                               | 3.17                                                        | -1.425                                                     | 1.932                                                         | 0.136                                                                 | 1.797                                                                   | -0.208                                                                       |
|                              | 88                    | 17 : 40 : 00         | 3368                                                               | 2.12                                                        | -0.901                                                     | 1.821                                                         | 0.120                                                                 | 1.701                                                                   | -0.172                                                                       |
|                              | 88                    | 20 : 34 : 00         | 3542                                                               | 1.27                                                        | -0.642                                                     | 1.705                                                         | 0.103                                                                 | 1.602                                                                   | -0.178                                                                       |



## CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-4 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD3  
 Task No.: NA Date, Start: 3/25/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.7 Piston Uplift,  $P_{up}$  (lbf): 34.75  
 Project Name: Exelon (Victoria) Completed: 4/2/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Mottled Very Pale Brown and Brownish Yellow Fat CLAY (CH)

Ring No.: 4 Area,  $A_r$  (cm<sup>2</sup>): 31.755 Solids Ht.,  $H_s$  (mm): 11.945 Specific Gravity,  $G_s =$  2.710 ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.14 Water 16.7 Void 0.603 Deg. of 74.9 Total Unit 122.9 Dry Unit 105.4  
**Final:** (mm):  $H_f$ : 18.10 Content,  $w$  (%): 19.3 Ratio,  $e$ : 0.516 Sat.,  $S$  (%): 101.3 Weight,  $\gamma_t$  (pcf): 132.9 Weight,  $\gamma_d$  (pcf): 111.4

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

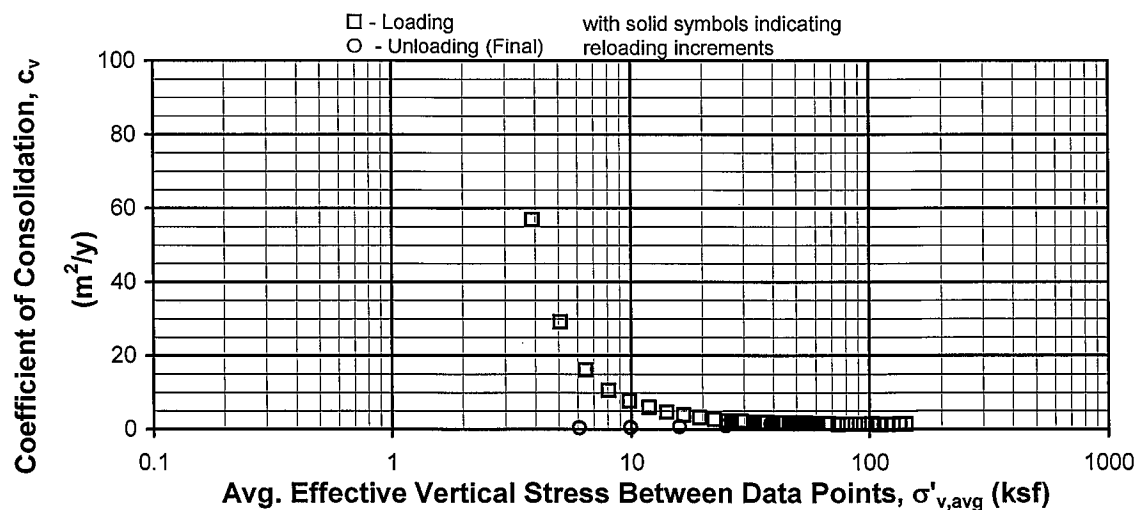
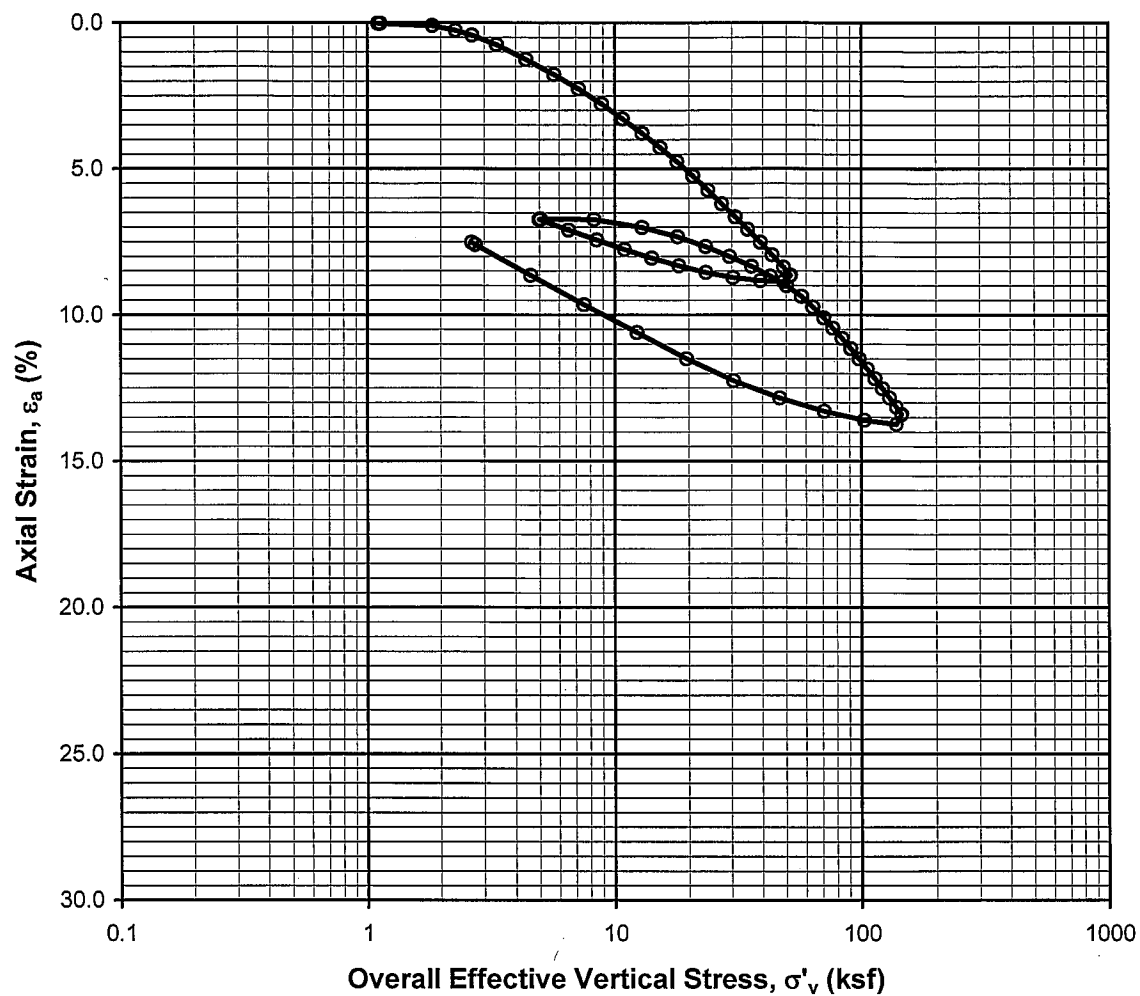
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.30                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.14                                                                                                                  | 0.600                              | 0.62                                                    |                                                                |                                                                                         | 19.115                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BE                           |                                                                          | 0.46                                                                    | 0.14                                                                                                                  | 0.600                              | 0.46                                                    | 0.000                                                          | 0.0                                                                                     | 19.116                                                |                                                                           |                                                                     | 0.600                                  |                                                   |                                                                                                     |                                                                                                       |
| CS                           | 0                                                                        | 0.42                                                                    | 0.03                                                                                                                  | 0.602                              | 0.42                                                    | 0.000                                                          | 0.0                                                                                     | 19.137                                                |                                                                           |                                                                     | 0.601                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 32                                                                       | 0.68                                                                    | 0.11                                                                                                                  | 0.601                              | 0.68                                                    | 0.000                                                          | 0.1                                                                                     | 19.121                                                | 0.55                                                                      |                                                                     | 0.601                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 64                                                                       | 0.99                                                                    | 0.36                                                                                                                  | 0.597                              | 0.99                                                    | 0.001                                                          | 0.1                                                                                     | 19.073                                                | 0.83                                                                      |                                                                     | 0.599                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 116                                                                      | 1.43                                                                    | 0.84                                                                                                                  | 0.589                              | 1.43                                                    | 0.000                                                          | 0.0                                                                                     | 18.981                                                | 1.21                                                                      |                                                                     | 0.593                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 180                                                                      | 2.02                                                                    | 1.42                                                                                                                  | 0.580                              | 2.01                                                    | -0.002                                                         | -0.1                                                                                    | 18.869                                                | 1.72                                                                      |                                                                     | 0.584                                  |                                                   | -513.48                                                                                             |                                                                                                       |
|                              | 244                                                                      | 2.66                                                                    | 1.93                                                                                                                  | 0.572                              | 2.67                                                    | 0.005                                                          | 0.2                                                                                     | 18.772                                                | 2.34                                                                      | 623.93                                                              | 0.576                                  | 9.84E-01                                          | 857.92                                                                                              |                                                                                                       |
|                              | 308                                                                      | 3.40                                                                    | 2.40                                                                                                                  | 0.564                              | 3.41                                                    | 0.006                                                          | 0.2                                                                                     | 18.683                                                | 3.03                                                                      | 195.65                                                              | 0.568                                  | 2.51E-01                                          | 407.57                                                                                              |                                                                                                       |
|                              | 372                                                                      | 4.38                                                                    | 2.91                                                                                                                  | 0.556                              | 4.38                                                    | 0.008                                                          | 0.2                                                                                     | 18.584                                                | 3.89                                                                      | 205.28                                                              | 0.560                                  | 2.21E-01                                          | 575.93                                                                                              |                                                                                                       |
|                              | 436                                                                      | 5.52                                                                    | 3.44                                                                                                                  | 0.547                              | 5.52                                                    | 0.008                                                          | 0.1                                                                                     | 18.484                                                | 4.95                                                                      | 199.96                                                              | 0.552                                  | 1.88E-01                                          | 708.82                                                                                              |                                                                                                       |
|                              | 500                                                                      | 6.90                                                                    | 3.96                                                                                                                  | 0.539                              | 6.91                                                    | 0.009                                                          | 0.1                                                                                     | 18.383                                                | 6.21                                                                      | 221.48                                                              | 0.543                                  | 1.71E-01                                          | 952.42                                                                                              |                                                                                                       |
|                              | 564                                                                      | 9.00                                                                    | 4.61                                                                                                                  | 0.529                              | 9.01                                                    | 0.009                                                          | 0.1                                                                                     | 18.259                                                | 7.95                                                                      | 318.61                                                              | 0.534                                  | 2.00E-01                                          | 1618.10                                                                                             |                                                                                                       |
|                              | 628                                                                      | 11.45                                                                   | 5.28                                                                                                                  | 0.518                              | 11.46                                                   | 0.007                                                          | 0.1                                                                                     | 18.131                                                | 10.23                                                                     | 425.16                                                              | 0.523                                  | 2.37E-01                                          | 2502.12                                                                                             |                                                                                                       |
|                              | 692                                                                      | 14.29                                                                   | 5.95                                                                                                                  | 0.507                              | 14.29                                                   | 0.005                                                          | 0.0                                                                                     | 18.004                                                | 12.87                                                                     | 665.07                                                              | 0.513                                  | 3.16E-01                                          | 4465.71                                                                                             |                                                                                                       |
|                              | 756                                                                      | 17.49                                                                   | 6.62                                                                                                                  | 0.496                              | 17.49                                                   | 0.007                                                          | 0.0                                                                                     | 17.875                                                | 15.89                                                                     | 754.04                                                              | 0.502                                  | 3.23E-01                                          | 5706.23                                                                                             |                                                                                                       |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

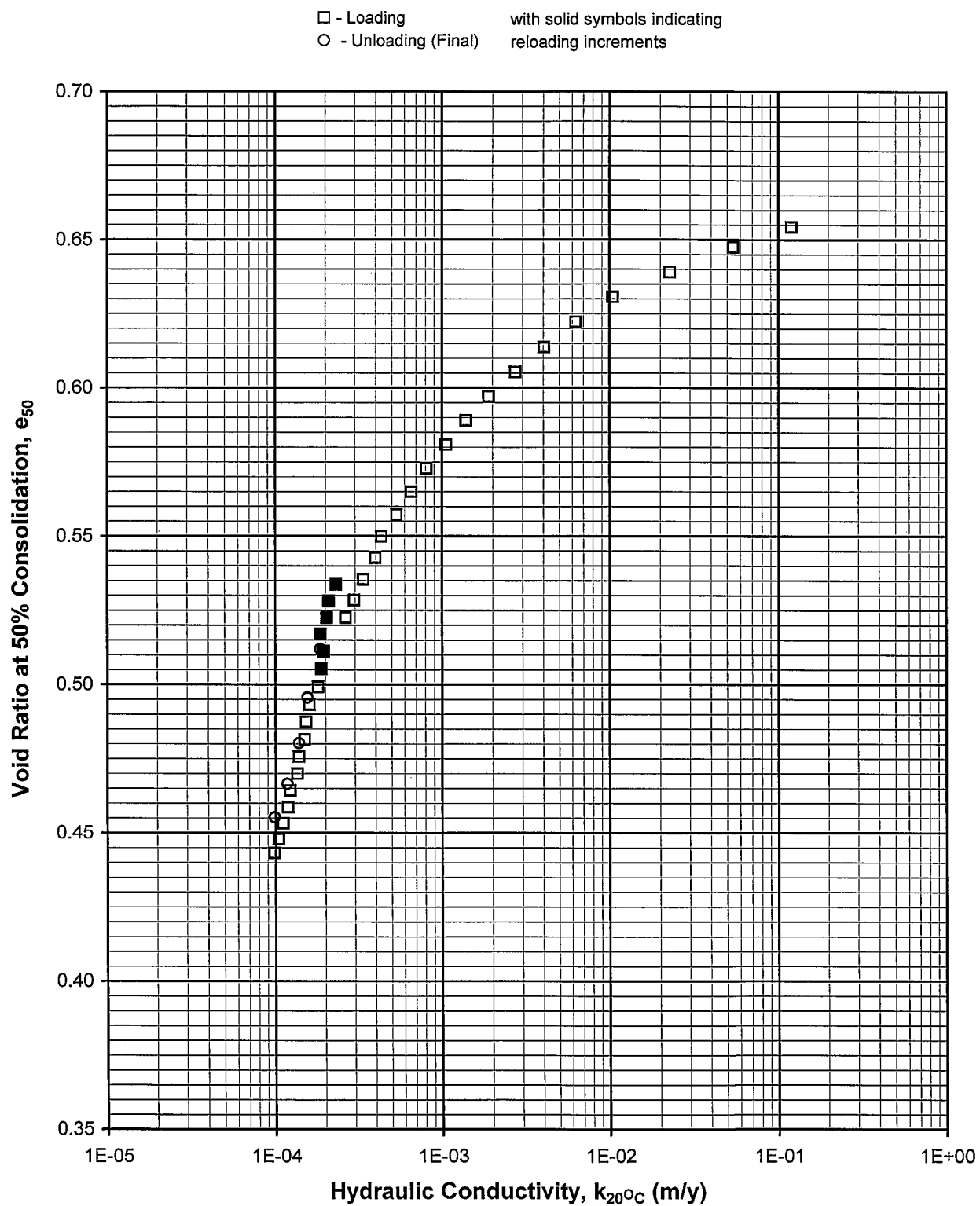
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$c_v \cdot t_n \cdot UCF$<br>$T_v \cdot (H_{c,avg})^2$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_{\alpha} =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                  |                                                                                                         |
|                              | 820                                                                      | 21.05                                                                   | 7.29                                                                                                                        | 0.486                              | 21.05                                                   | 0.004                                                          | 0.0                                                                                     | 17.747                                                | 19.27                                                                     | 864.94                                                      | 0.491                                  | 3.30E-01                                          | 7304.16                                                                                          |                                                                                                         |
|                              | 884                                                                      | 25.00                                                                   | 7.94                                                                                                                        | 0.475                              | 25.01                                                   | 0.010                                                          | 0.0                                                                                     | 17.623                                                | 23.02                                                                     | 743.56                                                      | 0.481                                  | 2.49E-01                                          | 6947.93                                                                                          |                                                                                                         |
|                              | 948                                                                      | 29.46                                                                   | 8.57                                                                                                                        | 0.465                              | 29.51                                                   | 0.075                                                          | 0.3                                                                                     | 17.502                                                | 27.23                                                                     | 135.02                                                      | 0.470                                  | 3.87E-02                                          | 1385.95                                                                                          |                                                                                                         |
|                              | 1012                                                                     | 34.29                                                                   | 9.19                                                                                                                        | 0.455                              | 34.49                                                   | 0.294                                                          | 0.9                                                                                     | 17.383                                                | 31.87                                                                     | 33.68                                                       | 0.460                                  | 8.60E-03                                          | 377.43                                                                                           |                                                                                                         |
|                              | 1076                                                                     | 39.47                                                                   | 9.81                                                                                                                        | 0.445                              | 39.99                                                   | 0.788                                                          | 2.0                                                                                     | 17.265                                                | 36.88                                                                     | 12.48                                                       | 0.450                                  | 2.87E-03                                          | 151.86                                                                                           |                                                                                                         |
|                              | 1140                                                                     | 44.96                                                                   | 10.40                                                                                                                       | 0.436                              | 46.09                                                   | 1.683                                                          | 3.7                                                                                     | 17.150                                                | 42.21                                                                     | 5.92                                                        | 0.441                                  | 1.21E-03                                          | 77.90                                                                                            |                                                                                                         |
| UE                           | 1204                                                                     | 50.85                                                                   | 10.98                                                                                                                       | 0.427                              | 53.00                                                   | 3.189                                                          | 6.0                                                                                     | 17.041                                                | 47.90                                                                     | 3.33                                                        | 0.431                                  | 5.81E-04                                          | 47.12                                                                                            |                                                                                                         |
|                              | 1216                                                                     | 52.02                                                                   | 11.08                                                                                                                       | 0.425                              | 54.41                                                   | 3.547                                                          | 6.5                                                                                     | 17.020                                                | 51.43                                                                     |                                                             | 0.426                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1218                                                                     | 51.77                                                                   | 11.09                                                                                                                       | 0.425                              | 53.98                                                   | 3.279                                                          | 6.1                                                                                     | 17.018                                                | 51.90                                                                     |                                                             | 0.425                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1292                                                                     | 45.44                                                                   | 11.20                                                                                                                       | 0.423                              | 45.22                                                   | -0.331                                                         | -0.7                                                                                    | 16.997                                                | 48.60                                                                     |                                                             | 0.424                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1366                                                                     | 36.19                                                                   | 11.15                                                                                                                       | 0.424                              | 35.63                                                   | -0.850                                                         | -2.4                                                                                    | 17.007                                                | 40.81                                                                     |                                                             | 0.423                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1440                                                                     | 28.43                                                                   | 11.03                                                                                                                       | 0.426                              | 27.67                                                   | -1.153                                                         | -4.2                                                                                    | 17.031                                                | 32.31                                                                     |                                                             | 0.425                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1514                                                                     | 22.20                                                                   | 10.84                                                                                                                       | 0.429                              | 21.28                                                   | -1.408                                                         | -6.6                                                                                    | 17.066                                                | 25.32                                                                     |                                                             | 0.427                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1588                                                                     | 17.30                                                                   | 10.62                                                                                                                       | 0.432                              | 16.25                                                   | -1.599                                                         | -9.8                                                                                    | 17.108                                                | 19.75                                                                     |                                                             | 0.431                                  |                                                   |                                                                                                  |                                                                                                         |
| US                           | 1662                                                                     | 13.45                                                                   | 10.37                                                                                                                       | 0.436                              | 12.35                                                   | -1.682                                                         | -13.6                                                                                   | 17.157                                                | 15.37                                                                     |                                                             | 0.434                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1736                                                                     | 10.45                                                                   | 10.09                                                                                                                       | 0.441                              | 9.38                                                    | -1.648                                                         | -17.6                                                                                   | 17.210                                                | 11.95                                                                     | 2.02                                                        | 0.439                                  | 3.53E-04                                          | 1.93                                                                                             |                                                                                                         |
|                              | 1810                                                                     | 8.13                                                                    | 9.80                                                                                                                        | 0.446                              | 7.15                                                    | -1.527                                                         | -21.4                                                                                   | 17.267                                                | 9.29                                                                      | 1.63                                                        | 0.443                                  | 3.91E-04                                          | 3.09                                                                                             |                                                                                                         |
|                              | 1884                                                                     | 6.38                                                                    | 9.49                                                                                                                        | 0.450                              | 5.52                                                    | -1.342                                                         | -24.3                                                                                   | 17.326                                                | 7.26                                                                      | 1.35                                                        | 0.448                                  | 4.51E-04                                          | 3.80                                                                                             |                                                                                                         |
|                              | 1956                                                                     | 5.16                                                                    | 9.22                                                                                                                        | 0.455                              | 4.48                                                    | -1.057                                                         | -23.6                                                                                   | 17.378                                                | 5.77                                                                      | 1.07                                                        | 0.453                                  | 4.88E-04                                          | 3.97                                                                                             |                                                                                                         |
| UE                           | 1958                                                                     | 5.05                                                                    | 9.21                                                                                                                        | 0.455                              | 4.33                                                    | -1.129                                                         | -26.1                                                                                   | 17.379                                                | 5.10                                                                      | 6.07                                                        | 0.455                                  | 5.97E-04                                          | 22.64                                                                                            |                                                                                                         |
|                              | 1976                                                                     | 6.34                                                                    | 9.19                                                                                                                        | 0.455                              | 6.45                                                    | 0.157                                                          | 2.4                                                                                     | 17.383                                                | 5.70                                                                      |                                                             | 0.455                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 1994                                                                     | 8.29                                                                    | 9.26                                                                                                                        | 0.454                              | 9.05                                                    | 1.113                                                          | 12.3                                                                                    | 17.369                                                | 7.32                                                                      |                                                             | 0.455                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 2012                                                                     | 10.26                                                                   | 9.37                                                                                                                        | 0.452                              | 11.39                                                   | 1.660                                                          | 14.6                                                                                    | 17.348                                                | 9.27                                                                      |                                                             | 0.453                                  |                                                   |                                                                                                  |                                                                                                         |
| US                           | 2030                                                                     | 12.19                                                                   | 9.50                                                                                                                        | 0.450                              | 13.62                                                   | 2.087                                                          | 15.3                                                                                    | 17.324                                                | 11.22                                                                     |                                                             | 0.451                                  |                                                   |                                                                                                  |                                                                                                         |
|                              | 2048                                                                     | 14.15                                                                   | 9.63                                                                                                                        | 0.448                              | 15.84                                                   | 2.468                                                          | 15.6                                                                                    | 17.299                                                | 13.17                                                                     |                                                             | 0.449                                  |                                                   | 0.90                                                                                             |                                                                                                         |
|                              | 2066                                                                     | 16.13                                                                   | 9.76                                                                                                                        | 0.446                              | 18.03                                                   | 2.782                                                          | 15.4                                                                                    | 17.273                                                | 15.14                                                                     | 3.36                                                        | 0.447                                  | 4.85E-04                                          | 1.54                                                                                             |                                                                                                         |
|                              | 2084                                                                     | 18.21                                                                   | 9.90                                                                                                                        | 0.444                              | 20.31                                                   | 3.064                                                          | 15.1                                                                                    | 17.247                                                | 17.17                                                                     | 3.12                                                        | 0.445                                  | 4.30E-04                                          | 2.15                                                                                             |                                                                                                         |
|                              | 2102                                                                     | 20.37                                                                   | 10.04                                                                                                                       | 0.442                              | 22.64                                                   | 3.314                                                          | 14.6                                                                                    | 17.219                                                | 19.29                                                                     | 2.94                                                        | 0.443                                  | 4.03E-04                                          | 2.71                                                                                             |                                                                                                         |
|                              | 2120                                                                     | 22.61                                                                   | 10.17                                                                                                                       | 0.440                              | 24.99                                                   | 3.482                                                          | 13.9                                                                                    | 17.195                                                | 21.49                                                                     | 2.78                                                        | 0.441                                  | 3.46E-04                                          | 3.21                                                                                             |                                                                                                         |
|                              | 2138                                                                     | 24.98                                                                   | 10.31                                                                                                                       | 0.437                              | 27.49                                                   | 3.673                                                          | 13.4                                                                                    | 17.168                                                | 23.80                                                                     | 2.80                                                        | 0.438                                  | 3.55E-04                                          | 3.89                                                                                             |                                                                                                         |

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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-4A - Depth 13.5 - 15.2 ft  
 Boring B-2321UD



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-4A - Depth 13.5 - 15.2 ft  
 Boring B-2321UD

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-1 File Name: B-2321\_UD4a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas.; ☐ Assumed Ring No.: 1  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.739  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                                          |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                                         | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                                       | No. Layers =            |
| Sample No.: UD-4                                   | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =                                      | Drop (in.) =            |
| Depth (ft): 13.5 - 15.2                            | Specimen No.: A                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

| Water<br>Content (W);              | Initial - Trimming Location                              |                         |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial            | Final  |       |
|------------------------------------|----------------------------------------------------------|-------------------------|------------|---------------------------------------|------------------------------------------------------------|--------------------|--------|-------|
|                                    | Top (W1)                                                 | Bottom (W2)             | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 329.02             | 328.02 |       |
| Container No.                      | 2004                                                     | 2007                    | 2031       | 56                                    | Mass Ring (g)                                              | 208.35             |        |       |
| Mass Moist Soil + Container (g)    | 125.91                                                   | 121.81                  | 102.05     | 69.59                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 120.67             | 119.67 |       |
| Mass Dry Soil + Container (g)      | 108.31                                                   | 106.06                  | 89.16      | 63.04                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |                    |        |       |
| Mass Container (g)                 | 30.45                                                    | 30.46                   | 30.60      | 30.33                                 | Container No.                                              |                    | 829    |       |
| WATER CONTENT (%)                  | 22.60                                                    | 20.83                   | 22.01      | 20.02                                 | Mass Dry Soil + Container (g)                              |                    | 32.59  |       |
| Avg. Initial Water Content, W4 (%) | 21.82                                                    | Final W <sub>at</sub> : | X          | Slice ;                               | Whole Spec.                                                | Mass Container (g) |        | 32.30 |
|                                    | See attached data sheet(s) for additional water contents |                         |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |                    | 0.29   |       |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.070 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.070                                                                                                                                                                       | 0.000                                  | 11.980                                    | 13.430                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.100                                                              | 11.966 |
| 19.140                                                                                                                                                                       | 0.000                                  | 11.780                                    | 13.360                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.382 |
| 19.110                                                                                                                                                                       | 0.000                                  | 11.920                                    | 13.390                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.100                                                              | 17.654 |
| 19.100                                                                                                                                                                       | 0.000                                  | 12.130                                    | 13.410                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.080                                                                                                                                                                       | 0.000                                  | 12.020                                    | 13.320                      | Initial Height, $H_o$                                   |  | 19.100                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{e,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{e,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             |                                                         |  | Final Soil Height Measurement, $H_{f,m}$                            |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             |                                                         |  | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               |        |

| Estimated Initial Unit Weight                                                              |        |                             |        | Soil Extruded During Loading                            |      |
|--------------------------------------------------------------------------------------------|--------|-----------------------------|--------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                              | 124.27 | Dry, $\gamma_{d,o}$ (pcf) = | 102.01 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54;                     |        |                             |        | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No |        |                             |        | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No  |        |                             |        | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/6/2008 Date: 4/6/2008 Final Calc. By: DH Date: 4/10/2008  
 Reviewed By: HP *HP*

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-1 File Name: B-2321\_UD4a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 22.60                    | 98.42                    | 91.5                         | 107.6                 | 107.4 |
| 2                | " Bottom, W2          | 20.83                    | 99.86                    | 87.4                         | 103.1                 | 102.9 |
| 3                | " Sides, W3           | 22.01                    | 98.90                    | 90.1                         | 106.1                 | 106.0 |
| 4                | " Average, W4         | 21.82                    | 99.06                    | 89.7                         | 105.6                 | 105.5 |
| 5                | " Back Calculated (1) | 20.68                    | 99.99 (3)                | 87.1                         | 102.6                 | 102.5 |
| 6                | Final                 | 20.02                    | 99.99 (2)                | 87.1                         | 102.6                 | 102.5 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.758</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.739</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_s$                                                                | 0.11604 |
| Final Selected, $K_r$                                                           | 0.11604 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>100.80</u>                                                                |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>100.40</u>                                         |  |                              |

| Summary of Specimen Physical Properties |                      |               |                             |                                     |                                                               |                                    |                                                                        |                                            |                         |
|-----------------------------------------|----------------------|---------------|-----------------------------|-------------------------------------|---------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------|--------------------------------------------|-------------------------|
| Specific Gravity<br>$G_s$ = 2.720       |                      |               | Assumed                     |                                     | To make $S_r$ = 100% at end of test.                          |                                    |                                                                        |                                            |                         |
|                                         |                      | X             | Measured                    |                                     | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_r$ = 100% |                                    |                                                                        |                                            |                         |
| Mass Dry Soil, (g)                      | Initial:             | 99.99         | X                           | From Cal. Routine No.               |                                                               | 5                                  | Note: Routine #5 is based on final measurements.                       |                                            |                         |
|                                         | Final (4):           | NA            |                             | Make $S_r$ = 100%, or;              |                                                               |                                    | Avg. of measured & make $S_r$ = 100%                                   |                                            |                         |
| Initial Height (mm) =                   |                      |               | 19.10                       | X                                   | Measured ;                                                    |                                    |                                                                        | Back Calculated                            | Back-cal. Sat. (%) = NA |
| Final Height (mm) =                     |                      |               | 17.65                       | X                                   | Measured ;                                                    |                                    |                                                                        | Initial $H_o$ & dial change during loading |                         |
|                                         | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                             | Height of Solids, $H_s$ (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) : |                                            |                         |
| Initial                                 | 20.7                 | 0.646         | 87.1                        | 124.3                               | 103.0                                                         | 11.604                             | From                                                                   | To (ksf)                                   |                         |
| Final                                   | 19.7                 | 0.521         | 102.6                       | 133.3                               | 111.4                                                         | NA                                 | NA                                                                     | NA                                         |                         |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 81 | Minus 200 (%) |
| Casagrande Method      | 9.30              | NA                                | 0.104 | 0.027 | 4.9 | Plastic Limit (PL)    | 22 | 92.2          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 59 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP HP

Date: 4/14/2008



# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686      Test Station No.: CRS-1      File Name: B-2321\_UD4a  
 Task No.: NA      Date; Start: 4/6/2008      Initial Height,  $H_o$  (mm): 19.10  
 Project Name: Exelon (Victoria)      Completed: 4/10/2008      Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7385  
 Test: Initial / Pressure      Gauge Back Pressure,  $U_G$  (psi): 70      ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values:      Back Pressure,  $U_{b,BE}$  (psi): 70.57599 ,V: 0.02283221      Piston Uplift,  $P_{up}$  (lbf): 34.67  
                                  Back Pressure,  $U_{b,CS}$  (psi): 70.58469 ,V: 0.02283503      Setup  $DT_{ref}$  (V): 0.04607446  
 Displacement Transducer No.: DT-101      Calib. Factor (mm/V): -213.274      Ch. No.: 1  
 Pore Press. Transducer No.: PT-107      Calib. Factor (psi/V): 3086.313      Ref. Zero (V): -0.000035      Ch. No.: 2  
 Force Cell No.: FT-099      Calib. Factor (lbf/V): 161209.607      Ref. Zero (V): 0.000116      Ch. No.: 3

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
     US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ), corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH      Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| S                            | 97                    | 16 : 37 : 00         |                                                                    | 0.32                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                 |
| BS                           | 97                    | 16 : 56 : 00         |                                                                    | 1.22                                                        |                                                            | 0.047                                                         | 0.026                                                                 | 0.021                                                                   |                                                                                 |
| BE                           | 98                    | 12 : 07 : 00         |                                                                    | 1.11                                                        | -0.001                                                     | 0.027                                                         | 0.023                                                                 | 0.004                                                                   |                                                                                 |
| CS                           | 98                    | 12 : 08 : 00         | 0                                                                  | 1.13                                                        | 0.000                                                      | 0.028                                                         | 0.024                                                                 | 0.004                                                                   |                                                                                 |
|                              | 98                    | 12 : 26 : 00         | 18                                                                 | 1.85                                                        | 0.004                                                      | 0.055                                                         | 0.036                                                                 | 0.019                                                                   | 0.261                                                                           |
|                              | 98                    | 12 : 44 : 00         | 36                                                                 | 2.30                                                        | 0.008                                                      | 0.094                                                         | 0.043                                                                 | 0.050                                                                   | 0.550                                                                           |
| US                           | 98                    | 13 : 02 : 00         | 54                                                                 | 2.70                                                        | 0.012                                                      | 0.131                                                         | 0.049                                                                 | 0.081                                                                   | 0.542                                                                           |
|                              | 98                    | 13 : 28 : 00         | 80                                                                 | 3.39                                                        | 0.029                                                      | 0.202                                                         | 0.059                                                                 | 0.143                                                                   | 0.749                                                                           |
|                              | 98                    | 14 : 04 : 00         | 116                                                                | 4.47                                                        | 0.071                                                      | 0.312                                                         | 0.072                                                                 | 0.240                                                                   | 0.843                                                                           |
|                              | 98                    | 14 : 40 : 00         | 152                                                                | 5.83                                                        | 0.168                                                      | 0.424                                                         | 0.086                                                                 | 0.338                                                                   | 0.853                                                                           |
|                              | 98                    | 15 : 16 : 00         | 188                                                                | 7.42                                                        | 0.329                                                      | 0.532                                                         | 0.100                                                                 | 0.432                                                                   | 0.822                                                                           |
|                              | 98                    | 15 : 52 : 00         | 224                                                                | 9.24                                                        | 0.528                                                      | 0.643                                                         | 0.113                                                                 | 0.530                                                                   | 0.858                                                                           |
|                              | 98                    | 16 : 28 : 00         | 260                                                                | 11.32                                                       | 0.781                                                      | 0.752                                                         | 0.125                                                                 | 0.628                                                                   | 0.848                                                                           |
|                              | 98                    | 17 : 04 : 00         | 296                                                                | 13.68                                                       | 1.109                                                      | 0.860                                                         | 0.137                                                                 | 0.723                                                                   | 0.835                                                                           |
|                              | 98                    | 17 : 40 : 00         | 332                                                                | 16.31                                                       | 1.506                                                      | 0.964                                                         | 0.148                                                                 | 0.816                                                                   | 0.809                                                                           |
|                              | 98                    | 18 : 16 : 00         | 368                                                                | 19.34                                                       | 2.048                                                      | 1.068                                                         | 0.159                                                                 | 0.909                                                                   | 0.812                                                                           |
|                              | 98                    | 18 : 52 : 00         | 404                                                                | 22.62                                                       | 2.628                                                      | 1.173                                                         | 0.170                                                                 | 1.003                                                                   | 0.820                                                                           |
|                              | 98                    | 19 : 28 : 00         | 440                                                                | 26.16                                                       | 3.234                                                      | 1.275                                                         | 0.181                                                                 | 1.094                                                                   | 0.793                                                                           |
|                              | 98                    | 20 : 04 : 00         | 476                                                                | 29.89                                                       | 3.825                                                      | 1.376                                                         | 0.192                                                                 | 1.184                                                                   | 0.784                                                                           |
|                              | 98                    | 20 : 40 : 00         | 512                                                                | 34.11                                                       | 4.453                                                      | 1.474                                                         | 0.203                                                                 | 1.270                                                                   | 0.758                                                                           |
|                              | 98                    | 21 : 16 : 00         | 548                                                                | 38.33                                                       | 4.996                                                      | 1.566                                                         | 0.214                                                                 | 1.351                                                                   | 0.706                                                                           |
|                              | 98                    | 21 : 52 : 00         | 584                                                                | 43.16                                                       | 5.706                                                      | 1.663                                                         | 0.226                                                                 | 1.436                                                                   | 0.740                                                                           |
|                              | 98                    | 22 : 28 : 00         | 620                                                                | 48.25                                                       | 6.389                                                      | 1.757                                                         | 0.239                                                                 | 1.518                                                                   | 0.714                                                                           |
|                              | 98                    | 23 : 04 : 00         | 656                                                                | 53.61                                                       | 7.018                                                      | 1.851                                                         | 0.252                                                                 | 1.599                                                                   | 0.705                                                                           |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 98                    | 23 : 28 : 00         | 680                                                                | 57.33                                                       | 7.492                                                      | 1.912                                                         | 0.261                                                                 | 1.651                                                                   | 0.683                                                                        |
| UE                           | 98                    | 23 : 30 : 00         | 682                                                                | 56.61                                                       | 6.900                                                      | 1.915                                                         | 0.259                                                                 | 1.656                                                                   | 0.741                                                                        |
|                              | 99                    | 00 : 24 : 00         | 736                                                                | 49.83                                                       | 1.379                                                      | 1.936                                                         | 0.242                                                                 | 1.694                                                                   | 0.223                                                                        |
|                              | 99                    | 01 : 18 : 00         | 790                                                                | 38.45                                                       | -1.247                                                     | 1.899                                                         | 0.211                                                                 | 1.688                                                                   | -0.035                                                                       |
|                              | 99                    | 02 : 12 : 00         | 844                                                                | 29.09                                                       | -1.976                                                     | 1.848                                                         | 0.182                                                                 | 1.666                                                                   | -0.130                                                                       |
| US                           | 99                    | 03 : 06 : 00         | 898                                                                | 21.79                                                       | -2.609                                                     | 1.789                                                         | 0.156                                                                 | 1.632                                                                   | -0.194                                                                       |
|                              | 99                    | 04 : 00 : 00         | 952                                                                | 16.25                                                       | -3.074                                                     | 1.724                                                         | 0.134                                                                 | 1.590                                                                   | -0.249                                                                       |
|                              | 99                    | 04 : 54 : 00         | 1006                                                               | 12.04                                                       | -3.321                                                     | 1.654                                                         | 0.115                                                                 | 1.539                                                                   | -0.294                                                                       |
|                              | 99                    | 05 : 48 : 00         | 1060                                                               | 8.82                                                        | -3.431                                                     | 1.581                                                         | 0.099                                                                 | 1.482                                                                   | -0.332                                                                       |
|                              | 99                    | 06 : 42 : 00         | 1114                                                               | 6.37                                                        | -3.440                                                     | 1.505                                                         | 0.085                                                                 | 1.420                                                                   | -0.358                                                                       |
|                              | 99                    | 07 : 36 : 00         | 1168                                                               | 4.55                                                        | -3.325                                                     | 1.428                                                         | 0.072                                                                 | 1.355                                                                   | -0.379                                                                       |
| UE                           | 99                    | 08 : 30 : 00         | 1222                                                               | 3.17                                                        | -3.151                                                     | 1.349                                                         | 0.061                                                                 | 1.288                                                                   | -0.392                                                                       |
|                              | 99                    | 08 : 32 : 00         | 1224                                                               | 3.13                                                        | -3.145                                                     | 1.347                                                         | 0.061                                                                 | 1.286                                                                   | -0.306                                                                       |
|                              | 99                    | 08 : 34 : 00         | 1226                                                               | 3.26                                                        | -3.018                                                     | 1.345                                                         | 0.062                                                                 | 1.283                                                                   | -0.520                                                                       |
|                              | 99                    | 09 : 10 : 00         | 1262                                                               | 9.29                                                        | 1.465                                                      | 1.388                                                         | 0.102                                                                 | 1.287                                                                   | 0.037                                                                        |
|                              | 99                    | 09 : 46 : 00         | 1298                                                               | 15.78                                                       | 4.044                                                      | 1.470                                                         | 0.132                                                                 | 1.338                                                                   | 0.443                                                                        |
| US                           | 99                    | 10 : 22 : 00         | 1334                                                               | 22.03                                                       | 5.690                                                      | 1.557                                                         | 0.157                                                                 | 1.399                                                                   | 0.538                                                                        |
|                              | 99                    | 10 : 58 : 00         | 1370                                                               | 28.25                                                       | 6.844                                                      | 1.644                                                         | 0.179                                                                 | 1.464                                                                   | 0.568                                                                        |
|                              | 99                    | 11 : 34 : 00         | 1406                                                               | 34.62                                                       | 7.430                                                      | 1.729                                                         | 0.200                                                                 | 1.529                                                                   | 0.566                                                                        |
|                              | 99                    | 12 : 10 : 00         | 1442                                                               | 41.55                                                       | 7.850                                                      | 1.813                                                         | 0.220                                                                 | 1.593                                                                   | 0.555                                                                        |
|                              | 99                    | 12 : 46 : 00         | 1478                                                               | 48.71                                                       | 8.003                                                      | 1.898                                                         | 0.240                                                                 | 1.658                                                                   | 0.569                                                                        |
|                              | 99                    | 13 : 22 : 00         | 1514                                                               | 56.25                                                       | 8.492                                                      | 1.980                                                         | 0.259                                                                 | 1.721                                                                   | 0.550                                                                        |
|                              | 99                    | 13 : 58 : 00         | 1550                                                               | 63.46                                                       | 8.449                                                      | 2.065                                                         | 0.276                                                                 | 1.789                                                                   | 0.596                                                                        |
|                              | 99                    | 14 : 34 : 00         | 1586                                                               | 70.10                                                       | 8.941                                                      | 2.150                                                         | 0.292                                                                 | 1.858                                                                   | 0.598                                                                        |
|                              | 99                    | 15 : 10 : 00         | 1622                                                               | 77.44                                                       | 9.722                                                      | 2.239                                                         | 0.310                                                                 | 1.929                                                                   | 0.620                                                                        |
|                              | 99                    | 15 : 46 : 00         | 1658                                                               | 83.88                                                       | 10.050                                                     | 2.322                                                         | 0.326                                                                 | 1.996                                                                   | 0.587                                                                        |
|                              | 99                    | 16 : 22 : 00         | 1694                                                               | 90.93                                                       | 10.234                                                     | 2.405                                                         | 0.343                                                                 | 2.063                                                                   | 0.579                                                                        |
|                              | 99                    | 16 : 58 : 00         | 1730                                                               | 98.23                                                       | 10.778                                                     | 2.491                                                         | 0.361                                                                 | 2.131                                                                   | 0.595                                                                        |
|                              | 99                    | 17 : 34 : 00         | 1766                                                               | 105.61                                                      | 10.861                                                     | 2.575                                                         | 0.379                                                                 | 2.196                                                                   | 0.571                                                                        |
|                              | 99                    | 18 : 10 : 00         | 1802                                                               | 113.87                                                      | 11.531                                                     | 2.662                                                         | 0.399                                                                 | 2.263                                                                   | 0.584                                                                        |
|                              | 99                    | 18 : 46 : 00         | 1838                                                               | 121.59                                                      | 11.732                                                     | 2.745                                                         | 0.418                                                                 | 2.326                                                                   | 0.553                                                                        |
|                              | 99                    | 19 : 22 : 00         | 1874                                                               | 130.21                                                      | 12.286                                                     | 2.830                                                         | 0.440                                                                 | 2.391                                                                   | 0.561                                                                        |
|                              | 99                    | 19 : 58 : 00         | 1910                                                               | 138.30                                                      | 12.213                                                     | 2.912                                                         | 0.460                                                                 | 2.452                                                                   | 0.537                                                                        |
|                              | 99                    | 20 : 34 : 00         | 1946                                                               | 147.78                                                      | 13.016                                                     | 2.996                                                         | 0.484                                                                 | 2.512                                                                   | 0.524                                                                        |
| UE                           | 99                    | 21 : 02 : 00         | 1974                                                               | 155.00                                                      | 13.151                                                     | 3.060                                                         | 0.502                                                                 | 2.558                                                                   | 0.519                                                                        |
|                              | 99                    | 21 : 04 : 00         | 1976                                                               | 154.34                                                      | 12.628                                                     | 3.063                                                         | 0.501                                                                 | 2.562                                                                   | 0.607                                                                        |
|                              | 99                    | 23 : 24 : 00         | 2116                                                               | 140.01                                                      | 1.714                                                      | 3.104                                                         | 0.479                                                                 | 2.625                                                                   | 0.141                                                                        |
|                              | 100                   | 01 : 44 : 00         | 2256                                                               | 101.37                                                      | -2.645                                                     | 3.011                                                         | 0.414                                                                 | 2.597                                                                   | -0.063                                                                       |
|                              | 100                   | 04 : 04 : 00         | 2396                                                               | 68.08                                                       | -4.353                                                     | 2.886                                                         | 0.348                                                                 | 2.538                                                                   | -0.131                                                                       |
| US                           | 100                   | 06 : 24 : 00         | 2536                                                               | 43.27                                                       | -5.873                                                     | 2.741                                                         | 0.286                                                                 | 2.454                                                                   | -0.189                                                                       |
|                              | 100                   | 08 : 44 : 00         | 2676                                                               | 26.40                                                       | -6.599                                                     | 2.576                                                         | 0.234                                                                 | 2.341                                                                   | -0.254                                                                       |
|                              | 100                   | 11 : 04 : 00         | 2816                                                               | 15.38                                                       | -6.760                                                     | 2.388                                                         | 0.192                                                                 | 2.196                                                                   | -0.325                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-1 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD4

Task No.: NA Date; Start: 4/6/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.6 Piston Uplift,  $P_{up}$  (lbf): 34.67

Project Name: Exelon (Victoria) Completed: 4/10/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt ; in ☐ g/kg

Final Description of Specimen: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Ring No.: 1 Area,  $A_r$  (cm<sup>2</sup>): 31.739 Solids Ht.,  $H_s$  (mm): 11.604 Specific Gravity,  $G_s = 2.720$  ☒ Meas. ; ☐ Assumed

**Initial:** Height  $H_o$ : 19.10 Water 20.7 Void 0.646 Deg. of 87.1 Total Unit 124.3 Dry Unit 103.0

**Final:** (mm):  $H_f$ : 17.65 Content,  $w$  (%): 19.7 Ratio,  $e$ : 0.521 Sat.,  $S$  (%): 102.6 Weight,  $\gamma_t$  (pcf): 133.3 Weight,  $\gamma_d$  (pcf): 111.4

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *HP*

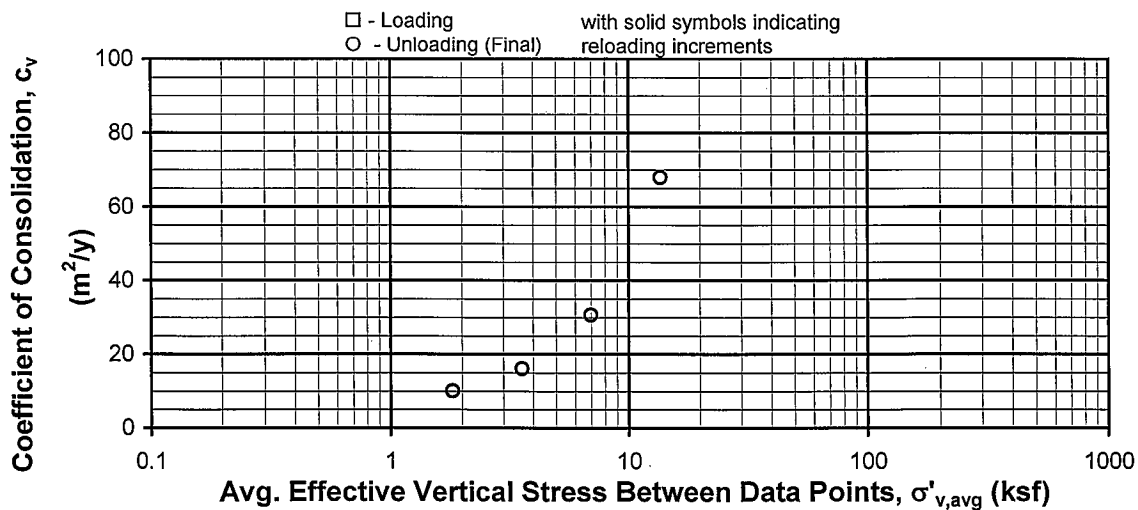
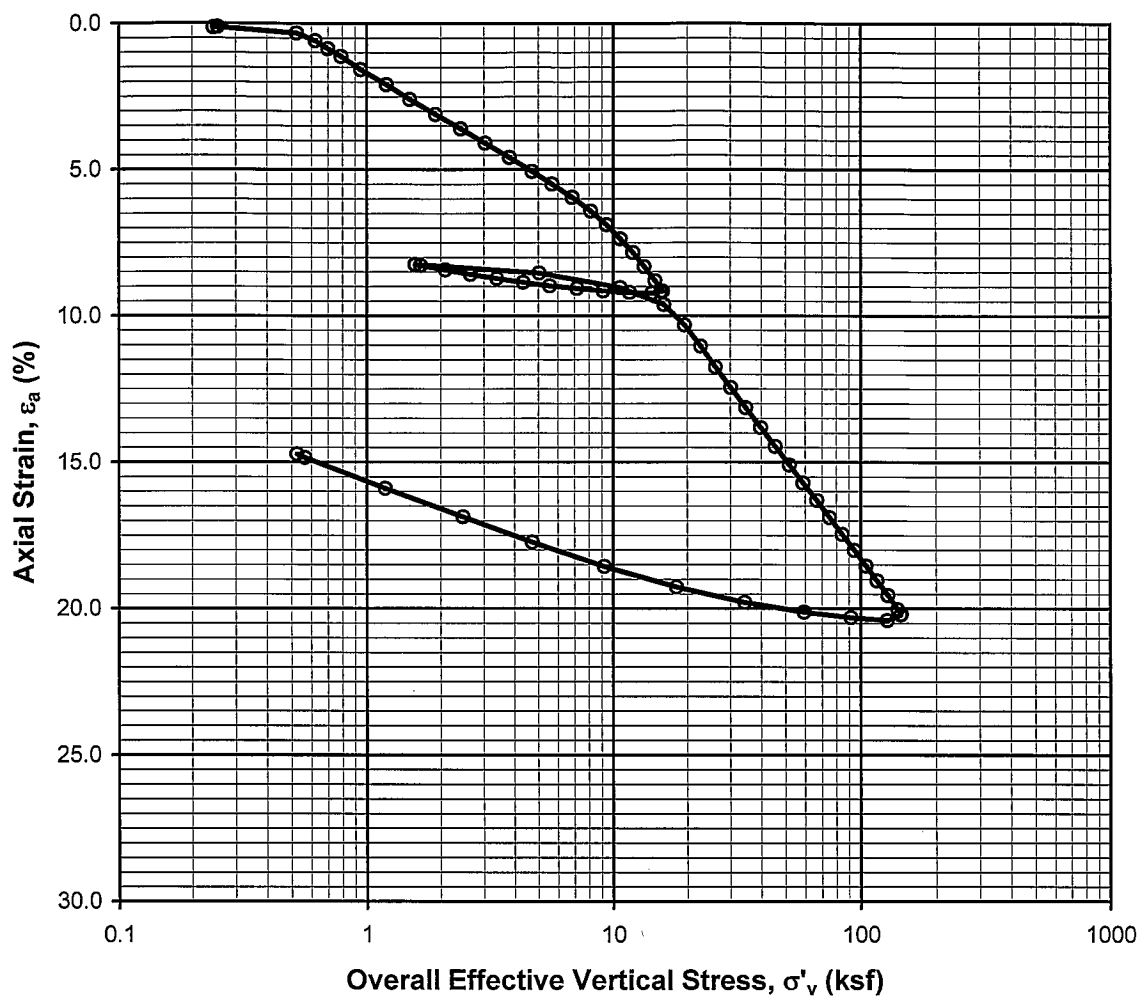
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n} (\epsilon_{ac,n})$<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n (2)$<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                         | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                   |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k @ 20^\circ C$<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                   |                                    | 0.32                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                         |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | 0.11                                                                                                              | 0.644                              | 1.22                                                    |                                                                |                                                                                         | 19.079                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                         |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 1.11                                                                    | 0.02                                                                                                              | 0.646                              | 1.11                                                    | -0.001                                                         | -0.1                                                                                    | 19.096                                                |                                                                           |                                                                     | 0.645                                  |                                                         |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 1.13                                                                    | 0.02                                                                                                              | 0.646                              | 1.13                                                    | 0.000                                                          | 0.0                                                                                     | 19.096                                                |                                                                           |                                                                     | 0.646                                  |                                                         |                                                                                                |                                                                                                  |
|                              | 18                                                                       | 1.85                                                                    | 0.10                                                                                                              | 0.644                              | 1.85                                                    | 0.004                                                          | 0.2                                                                                     | 19.081                                                | 1.49                                                                      |                                                                     | 0.645                                  |                                                         |                                                                                                |                                                                                                  |
|                              | 36                                                                       | 2.30                                                                    | 0.26                                                                                                              | 0.642                              | 2.30                                                    | 0.008                                                          | 0.3                                                                                     | 19.050                                                | 2.07                                                                      |                                                                     | 0.643                                  |                                                         |                                                                                                |                                                                                                  |
| US                           | 54                                                                       | 2.69                                                                    | 0.43                                                                                                              | 0.639                              | 2.70                                                    | 0.012                                                          | 0.4                                                                                     | 19.019                                                | 2.49                                                                      |                                                                     | 0.640                                  |                                                         |                                                                                                |                                                                                                  |
|                              | 80                                                                       | 3.37                                                                    | 0.75                                                                                                              | 0.634                              | 3.39                                                    | 0.029                                                          | 0.8                                                                                     | 18.957                                                | 3.03                                                                      | 124.96                                                              | 0.636                                  | 1.20E-01                                                | 34.29                                                                                          |                                                                                                  |
|                              | 116                                                                      | 4.42                                                                    | 1.26                                                                                                              | 0.625                              | 4.47                                                    | 0.071                                                          | 1.6                                                                                     | 18.860                                                | 3.90                                                                      | 56.86                                                               | 0.629                                  | 5.43E-02                                                | 37.52                                                                                          |                                                                                                  |
|                              | 152                                                                      | 5.71                                                                    | 1.77                                                                                                              | 0.617                              | 5.83                                                    | 0.168                                                          | 2.9                                                                                     | 18.762                                                | 5.07                                                                      | 29.18                                                               | 0.621                                  | 2.27E-02                                                | 30.75                                                                                          |                                                                                                  |
|                              | 188                                                                      | 7.20                                                                    | 2.26                                                                                                              | 0.609                              | 7.42                                                    | 0.329                                                          | 4.4                                                                                     | 18.668                                                | 6.46                                                                      | 16.15                                                               | 0.613                                  | 1.04E-02                                                | 23.51                                                                                          |                                                                                                  |
|                              | 224                                                                      | 8.89                                                                    | 2.78                                                                                                              | 0.600                              | 9.24                                                    | 0.528                                                          | 5.7                                                                                     | 18.570                                                | 8.04                                                                      | 10.55                                                               | 0.605                                  | 6.26E-03                                                | 19.69                                                                                          |                                                                                                  |
|                              | 260                                                                      | 10.79                                                                   | 3.29                                                                                                              | 0.592                              | 11.32                                                   | 0.781                                                          | 6.9                                                                                     | 18.472                                                | 9.84                                                                      | 7.70                                                                | 0.596                                  | 4.02E-03                                                | 17.61                                                                                          |                                                                                                  |
|                              | 296                                                                      | 12.93                                                                   | 3.79                                                                                                              | 0.584                              | 13.68                                                   | 1.109                                                          | 8.1                                                                                     | 18.377                                                | 11.86                                                                     | 5.98                                                                | 0.588                                  | 2.72E-03                                                | 16.23                                                                                          |                                                                                                  |
|                              | 332                                                                      | 15.29                                                                   | 4.27                                                                                                              | 0.576                              | 16.31                                                   | 1.506                                                          | 9.2                                                                                     | 18.284                                                | 14.11                                                                     | 4.72                                                                | 0.580                                  | 1.89E-03                                                | 14.87                                                                                          |                                                                                                  |
|                              | 368                                                                      | 17.95                                                                   | 4.76                                                                                                              | 0.568                              | 19.34                                                   | 2.048                                                          | 10.6                                                                                    | 18.191                                                | 16.62                                                                     | 3.94                                                                | 0.572                                  | 1.38E-03                                                | 14.17                                                                                          |                                                                                                  |
|                              | 404                                                                      | 20.83                                                                   | 5.25                                                                                                              | 0.560                              | 22.62                                                   | 2.628                                                          | 11.6                                                                                    | 18.097                                                | 19.39                                                                     | 3.18                                                                | 0.564                                  | 1.05E-03                                                | 12.88                                                                                          |                                                                                                  |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
|                              | 440                                                                      | 23.96                                                                   | 5.73                                                                                                                        | 0.552                              | 26.16                                                   | 3.234                                                          | 12.4                                                                                    | 18.006                                                | 22.39                                                                     | 2.70                                                        | 0.556                                  | 8.06E-04                                          | 12.17                                                                                               |                                                                                                       |
|                              | 476                                                                      | 27.28                                                                   | 6.20                                                                                                                        | 0.544                              | 29.89                                                   | 3.825                                                          | 12.8                                                                                    | 17.916                                                | 25.62                                                                     | 2.33                                                        | 0.548                                  | 6.56E-04                                          | 11.60                                                                                               |                                                                                                       |
|                              | 512                                                                      | 31.08                                                                   | 6.65                                                                                                                        | 0.537                              | 34.11                                                   | 4.453                                                          | 13.1                                                                                    | 17.830                                                | 29.18                                                                     | 2.23                                                        | 0.540                                  | 5.36E-04                                          | 12.15                                                                                               |                                                                                                       |
|                              | 548                                                                      | 34.92                                                                   | 7.08                                                                                                                        | 0.530                              | 38.33                                                   | 4.996                                                          | 13.0                                                                                    | 17.749                                                | 33.00                                                                     | 1.93                                                        | 0.533                                  | 4.33E-04                                          | 11.45                                                                                               |                                                                                                       |
|                              | 584                                                                      | 39.27                                                                   | 7.52                                                                                                                        | 0.522                              | 43.16                                                   | 5.706                                                          | 13.2                                                                                    | 17.664                                                | 37.10                                                                     | 1.93                                                        | 0.526                                  | 3.97E-04                                          | 12.41                                                                                               |                                                                                                       |
|                              | 620                                                                      | 43.89                                                                   | 7.95                                                                                                                        | 0.515                              | 48.25                                                   | 6.389                                                          | 13.2                                                                                    | 17.582                                                | 41.58                                                                     | 1.78                                                        | 0.519                                  | 3.36E-04                                          | 12.35                                                                                               |                                                                                                       |
|                              | 656                                                                      | 48.83                                                                   | 8.37                                                                                                                        | 0.508                              | 53.61                                                   | 7.018                                                          | 13.1                                                                                    | 17.501                                                | 46.36                                                                     | 1.68                                                        | 0.512                                  | 2.97E-04                                          | 12.49                                                                                               |                                                                                                       |
|                              | 680                                                                      | 52.22                                                                   | 8.64                                                                                                                        | 0.504                              | 57.33                                                   | 7.492                                                          | 13.1                                                                                    | 17.449                                                | 50.52                                                                     | 1.60                                                        | 0.506                                  | 2.63E-04                                          | 12.47                                                                                               |                                                                                                       |
| UE                           | 682                                                                      | 51.91                                                                   | 8.67                                                                                                                        | 0.503                              | 56.61                                                   | 6.900                                                          | 12.2                                                                                    | 17.444                                                | 52.07                                                                     |                                                             | 0.504                                  |                                                   | -29.29                                                                                              |                                                                                                       |
|                              | 736                                                                      | 48.91                                                                   | 8.87                                                                                                                        | 0.500                              | 49.83                                                   | 1.379                                                          | 2.8                                                                                     | 17.406                                                | 50.41                                                                     |                                                             | 0.502                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 790                                                                      | 39.28                                                                   | 8.84                                                                                                                        | 0.501                              | 38.45                                                   | -1.247                                                         | -3.2                                                                                    | 17.412                                                | 44.09                                                                     |                                                             | 0.500                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 844                                                                      | 30.39                                                                   | 8.72                                                                                                                        | 0.502                              | 29.09                                                   | -1.976                                                         | -6.8                                                                                    | 17.434                                                | 34.83                                                                     |                                                             | 0.501                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 898                                                                      | 23.49                                                                   | 8.55                                                                                                                        | 0.505                              | 21.79                                                   | -2.609                                                         | -12.0                                                                                   | 17.468                                                | 26.94                                                                     |                                                             | 0.504                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 952                                                                      | 18.24                                                                   | 8.32                                                                                                                        | 0.509                              | 16.25                                                   | -3.074                                                         | -18.9                                                                                   | 17.510                                                | 20.86                                                                     | 3.14                                                        | 0.507                                  | 2.34E-04                                          | 2.11                                                                                                |                                                                                                       |
|                              | 1006                                                                     | 14.17                                                                   | 8.06                                                                                                                        | 0.513                              | 12.04                                                   | -3.321                                                         | -27.6                                                                                   | 17.561                                                | 16.20                                                                     | 2.20                                                        | 0.511                                  | 2.45E-04                                          | 2.94                                                                                                |                                                                                                       |
|                              | 1060                                                                     | 10.98                                                                   | 7.76                                                                                                                        | 0.518                              | 8.82                                                    | -3.431                                                         | -38.9                                                                                   | 17.618                                                | 12.57                                                                     | 1.67                                                        | 0.516                                  | 2.61E-04                                          | 3.33                                                                                                |                                                                                                       |
|                              | 1114                                                                     | 8.49                                                                    | 7.44                                                                                                                        | 0.524                              | 6.37                                                    | -3.440                                                         | -54.0                                                                                   | 17.680                                                | 9.74                                                                      | 1.32                                                        | 0.521                                  | 2.74E-04                                          | 3.49                                                                                                |                                                                                                       |
|                              | 1168                                                                     | 6.55                                                                    | 7.10                                                                                                                        | 0.529                              | 4.55                                                    | -3.325                                                         | -73.1                                                                                   | 17.745                                                | 7.52                                                                      | 1.07                                                        | 0.526                                  | 2.93E-04                                          | 3.50                                                                                                |                                                                                                       |
| UE                           | 1222                                                                     | 5.03                                                                    | 6.74                                                                                                                        | 0.535                              | 3.17                                                    | -3.151                                                         | -99.3                                                                                   | 17.812                                                | 5.79                                                                      | 0.91                                                        | 0.532                                  | 3.14E-04                                          | 3.53                                                                                                |                                                                                                       |
|                              | 1224                                                                     | 4.98                                                                    | 6.73                                                                                                                        | 0.535                              | 3.13                                                    | -3.145                                                         | -100.5                                                                                  | 17.814                                                | 5.00                                                                      |                                                             | 0.535                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1226                                                                     | 5.04                                                                    | 6.72                                                                                                                        | 0.535                              | 3.26                                                    | -3.018                                                         | -92.7                                                                                   | 17.817                                                | 5.01                                                                      |                                                             | 0.535                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1262                                                                     | 8.29                                                                    | 6.74                                                                                                                        | 0.535                              | 9.29                                                    | 1.465                                                          | 15.8                                                                                    | 17.813                                                | 6.66                                                                      |                                                             | 0.535                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1298                                                                     | 12.95                                                                   | 7.00                                                                                                                        | 0.531                              | 15.78                                                   | 4.044                                                          | 25.6                                                                                    | 17.762                                                | 10.62                                                                     |                                                             | 0.533                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 1334                                                                     | 18.05                                                                   | 7.33                                                                                                                        | 0.525                              | 22.03                                                   | 5.690                                                          | 25.8                                                                                    | 17.701                                                | 15.50                                                                     |                                                             | 0.528                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 1370                                                                     | 23.48                                                                   | 7.67                                                                                                                        | 0.520                              | 28.25                                                   | 6.844                                                          | 24.2                                                                                    | 17.636                                                | 20.76                                                                     |                                                             | 0.523                                  |                                                   | 0.87                                                                                                |                                                                                                       |
|                              | 1406                                                                     | 29.47                                                                   | 8.01                                                                                                                        | 0.514                              | 34.62                                                   | 7.430                                                          | 21.5                                                                                    | 17.571                                                | 26.47                                                                     | 1.79                                                        | 0.517                                  | 2.30E-04                                          | 1.58                                                                                                |                                                                                                       |
|                              | 1442                                                                     | 36.14                                                                   | 8.34                                                                                                                        | 0.509                              | 41.55                                                   | 7.850                                                          | 18.9                                                                                    | 17.507                                                | 32.80                                                                     | 1.83                                                        | 0.511                                  | 2.08E-04                                          | 2.45                                                                                                |                                                                                                       |
|                              | 1478                                                                     | 43.22                                                                   | 8.68                                                                                                                        | 0.503                              | 48.71                                                   | 8.003                                                          | 16.4                                                                                    | 17.442                                                | 39.68                                                                     | 1.83                                                        | 0.506                                  | 2.03E-04                                          | 3.29                                                                                                |                                                                                                       |
|                              | 1514                                                                     | 50.43                                                                   | 9.01                                                                                                                        | 0.498                              | 56.25                                                   | 8.492                                                          | 15.1                                                                                    | 17.379                                                | 46.82                                                                     | 1.86                                                        | 0.500                                  | 1.86E-04                                          | 4.21                                                                                                |                                                                                                       |
|                              | 1550                                                                     | 57.70                                                                   | 9.37                                                                                                                        | 0.492                              | 63.46                                                   | 8.449                                                          | 13.3                                                                                    | 17.311                                                | 54.06                                                                     | 1.74                                                        | 0.495                                  | 1.94E-04                                          | 4.75                                                                                                |                                                                                                       |

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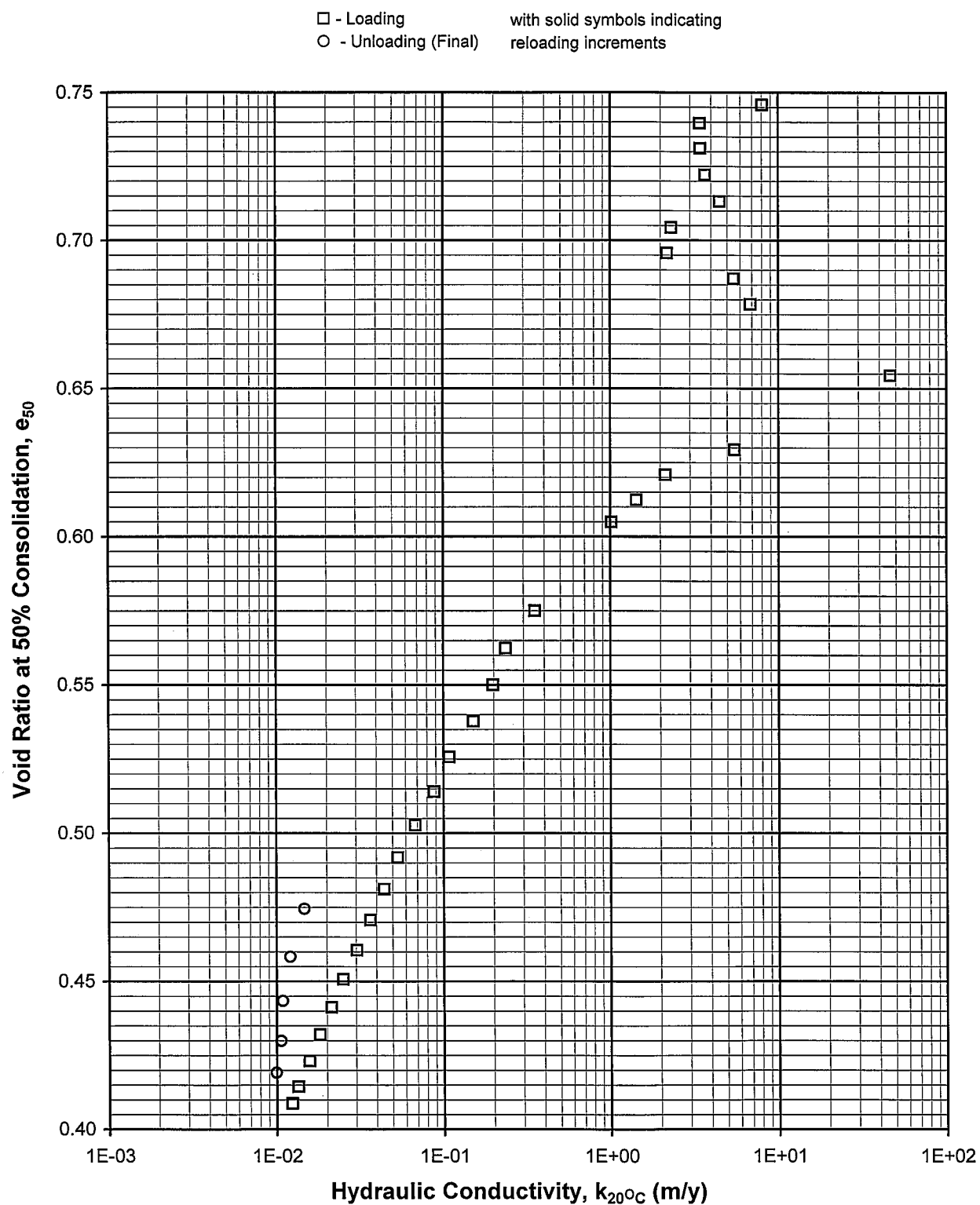
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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-5A - Depth 17.0 - 18.7 ft  
 Boring B-2321UD

KAW 7/16/08

Reviewed By: HP



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-5A - Depth 17.0 - 18.7 ft  
 Boring B-2321UD



# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD5a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas. ; ☐ Assumed Ring No.: 3  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.723  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                        |                                   |                                  |                                           |                         |
|----------------------------------------------------|-------------------------------------------|----------------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner         | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                               | <input type="checkbox"/> LPC Core         | <input type="checkbox"/> Impact/Rammer |                                   | Rammer Wgt. (lb) =               | No. Layers =                              |                         |
| Sample No.: UD-5                                   | Compostite No.:                           | <input type="checkbox"/> Pluviated:    |                                   | Tamper Force (lb) =              | Drop (in.) =                              |                         |
| Depth (ft): 17.0 - 18.7                            | Specimen No.: A                           | <input type="checkbox"/> Kneading      |                                   | Undercompaction: $U_{ni}$ (%) =  | Dia. (in.) =                              |                         |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                        |                                   | Ref. Effort =                    | % Comp. =                                 | $\pm$ Opt. =            |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                               | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                    |                                | Mass Moist Soil + Ring (g)                           | 323.88  | 323.49 |
| Container No.                                            | 779                         | 802              | 2026                                          | 684                            | Mass Ring (g)                                        | 211.72  |        |
| Mass Moist Soil + Container (g)                          | 126.23                      | 106.73           | 102.68                                        | 62.57                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 112.16  | 111.77 |
| Mass Dry Soil + Container (g)                            | 110.41                      | 94.82            | 91.03                                         | 56.55                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 31.69                       | 32.03            | 30.63                                         | 24.63                          | Container No.                                        | 5023    |        |
| WATER CONTENT (%)                                        | 20.10                       | 18.97            | 19.29                                         | 18.86                          | Mass Dry Soil + Container (g)                        | 31.19   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 19.45                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> X Slice ; | Whole Spec.                    | Mass Container (g)                                   | 31.14   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                               |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.05    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                          |                                             |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                          | Final                                       |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.060 |
| with Spec.                                                                                                                                                                   | without Spec.                            | with Spec.                                  | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.050                                                                                                                                                                       | 0.000                                    | 10.730                                      | 13.100                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.052                                                              | 10.664 |
| 19.070                                                                                                                                                                       | 0.000                                    | 10.580                                      | 13.040                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.070 |
| 19.050                                                                                                                                                                       | 0.000                                    | 10.560                                      | 13.050                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.052                                                              | 16.654 |
| 19.070                                                                                                                                                                       | 0.000                                    | 10.690                                      | 13.100                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.020                                                                                                                                                                       | 0.000                                    | 10.760                                      | 13.060                      | Initial Height, $H_o$                                   |  | 19.052                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> X No | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> X No | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                          |                                             |                             |                                                         |  | Final Soil Height Measurement, $H_{f,m}$                            |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                          |                                             |                             |                                                         |  | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               |        |
|                                                                                                                                                                              |                                          |                                             |                             |                                                         |  | -2.14                                                               |        |

| Estimated Initial Unit Weight                            |                                             |                                |       | Soil Extruded During Loading                            |      |
|----------------------------------------------------------|---------------------------------------------|--------------------------------|-------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                            | 115.85                                      | Dry, $\gamma_{d,o}$ (pcf) =    | 96.99 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> X | Whatman No. 54;                             | <input type="checkbox"/> Other |       | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom:                          | <input type="checkbox"/> Yes ;              | <input type="checkbox"/> No    |       | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only:                                      | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No    |       | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ X No

Final Visual Description: Mottled Brownish Yellow and Light Gray Lean CLAY (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ X "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ X Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/28/2008 Date: 3/28/2008 Final Calc. By: LF Date: 4/1/2008  
 Reviewed By: HP HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD5a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 20.10                    | 93.39                    | 72.2                         | 99.9                  | 107.4 |
| 2                | " Bottom, W2          | 18.97                    | 94.28                    | 69.7                         | 96.8                  | 104.2 |
| 3                | " Sides, W3           | 19.29                    | 94.02                    | 70.4                         | 97.7                  | 105.1 |
| 4                | " Average, W4         | 19.45                    | 93.90                    | 70.8                         | 98.1                  | 105.6 |
| 5                | " Back Calculated (1) | 19.21                    | 94.09 (3)                | 70.2                         | 97.5                  | 104.9 |
| 6                | Final                 | 18.86                    | 94.09 (2)                | 70.2                         | 97.5                  | 104.9 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.684</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.702</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11610 |
| Final Selected, $K_f$                                                           | 0.11610 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>93.35</u>                                                                 |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>93.72</u>                                          |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                                  |                                                                        |          |  |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|----------|--|
| Specific Gravity<br>G <sub>s</sub> = 2.720 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                                  |                                                                        |          |  |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                  |                                                                        |          |  |
| Mass Dry Soil, (g)                         | Initial:             | 94.09         | X                           | From Cal. Routine No.                   | 5                                                                                        | Note: Routine #5 is based on final measurements. |                                                                        |          |  |
|                                            | Final (4):           | NA            |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%    |                                                                        |          |  |
| Initial Height (mm) =                      |                      |               | 19.05                       | X                                       | Measured ;                                                                               |                                                  | Back Calculated Back-cal. Sat. (%) = NA                                |          |  |
| Final Height (mm) =                        |                      |               | 16.65                       | X                                       | Measured ;                                                                               |                                                  | Initial H <sub>o</sub> & dial change during loading                    |          |  |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm)      | Extruded soil loss proportioned in increasing loading increments (5) : |          |  |
| Initial                                    | 19.2                 | 0.744         | 70.2                        | 115.9                                   | 97.2                                                                                     | 10.923                                           | From                                                                   | To (ksf) |  |
| Final                                      | 18.8                 | 0.525         | 97.5                        | 132.1                                   | 111.2                                                                                    | NA                                               | NA                                                                     | NA       |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 40 | Minus 200 (%) |
| Casagrande Method      | 10.00             | NA                                | 0.113 | 0.012 | 4.3 | Plastic Limit (PL)    | 15 | 90.4          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 25 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP  
 Date: 4/2/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD5a  
 Task No.: NA Date; Start: 3/28/2008 Initial Height,  $H_o$  (mm): 19.05  
 Project Name: Exelon (Victoria) Completed: 4/1/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7233  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b,BE}$  (psi): 70.65509,  $V$ : 0.02312581 Piston Uplift,  $P_{up}$  (lbf): 34.70  
 Back Pressure,  $U_{b,CS}$  (psi): 70.63945,  $V$ : 0.02312065 Setup  $DT_{ref}$  (V): 0.04953916  
 Displacement Transducer No.: DT-103 Calib. Factor (mm/V): -213.848 Ch. No.: 7  
 Pore Press. Transducer No.: PT-108 Calib. Factor (psi/V): 3029.501 Ref. Zero (V): -0.000197 Ch. No.: 8  
 Force Cell No.: FT-103 Calib. Factor (lbf/V): 161103.256 Ref. Zero (V): 0.000105 Ch. No.: 9

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP ~~HP~~

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>$n$ & $n-1$ ,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| S                            | 88                    | 15 : 17 : 00         |                                                                    | 0.14                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                   |
| BS                           | 88                    | 15 : 30 : 00         |                                                                    | 0.37                                                        |                                                            | 0.047                                                         | 0.000                                                                 | 0.047                                                                   |                                                                                   |
| BE                           | 89                    | 16 : 49 : 00         |                                                                    | 0.25                                                        | 0.002                                                      | 0.027                                                         | 0.000                                                                 | 0.027                                                                   |                                                                                   |
| CS                           | 89                    | 16 : 50 : 00         | 0                                                                  | 0.25                                                        | 0.000                                                      | 0.027                                                         | 0.004                                                                 | 0.023                                                                   |                                                                                   |
|                              | 89                    | 17 : 10 : 00         | 20                                                                 | 0.52                                                        | 0.000                                                      | 0.069                                                         | 0.007                                                                 | 0.062                                                                   | 0.608                                                                             |
|                              | 89                    | 17 : 30 : 00         | 40                                                                 | 0.62                                                        | 0.000                                                      | 0.123                                                         | 0.010                                                                 | 0.113                                                                   | 0.813                                                                             |
| US                           | 89                    | 17 : 50 : 00         | 60                                                                 | 0.70                                                        | 0.000                                                      | 0.177                                                         | 0.012                                                                 | 0.165                                                                   | 0.808                                                                             |
|                              | 89                    | 18 : 10 : 00         | 80                                                                 | 0.79                                                        | 0.001                                                      | 0.230                                                         | 0.015                                                                 | 0.215                                                                   | 0.793                                                                             |
|                              | 89                    | 18 : 44 : 00         | 114                                                                | 0.95                                                        | 0.001                                                      | 0.320                                                         | 0.020                                                                 | 0.300                                                                   | 0.786                                                                             |
|                              | 89                    | 19 : 24 : 00         | 154                                                                | 1.21                                                        | 0.001                                                      | 0.426                                                         | 0.028                                                                 | 0.398                                                                   | 0.773                                                                             |
|                              | 89                    | 20 : 04 : 00         | 194                                                                | 1.50                                                        | 0.001                                                      | 0.530                                                         | 0.036                                                                 | 0.494                                                                   | 0.760                                                                             |
|                              | 89                    | 20 : 44 : 00         | 234                                                                | 1.91                                                        | 0.000                                                      | 0.637                                                         | 0.045                                                                 | 0.591                                                                   | 0.763                                                                             |
|                              | 89                    | 21 : 24 : 00         | 274                                                                | 2.41                                                        | 0.002                                                      | 0.740                                                         | 0.055                                                                 | 0.685                                                                   | 0.740                                                                             |
|                              | 89                    | 22 : 04 : 00         | 314                                                                | 3.04                                                        | 0.000                                                      | 0.843                                                         | 0.065                                                                 | 0.778                                                                   | 0.730                                                                             |
|                              | 89                    | 22 : 44 : 00         | 354                                                                | 3.82                                                        | 0.000                                                      | 0.948                                                         | 0.076                                                                 | 0.872                                                                   | 0.737                                                                             |
|                              | 89                    | 23 : 24 : 00         | 394                                                                | 4.73                                                        | 0.000                                                      | 1.050                                                         | 0.086                                                                 | 0.964                                                                   | 0.722                                                                             |
|                              | 90                    | 00 : 04 : 00         | 434                                                                | 5.69                                                        | -0.001                                                     | 1.141                                                         | 0.096                                                                 | 1.046                                                                   | 0.646                                                                             |
|                              | 90                    | 00 : 44 : 00         | 474                                                                | 6.85                                                        | 0.000                                                      | 1.238                                                         | 0.106                                                                 | 1.133                                                                   | 0.688                                                                             |
|                              | 90                    | 01 : 24 : 00         | 514                                                                | 8.13                                                        | 0.000                                                      | 1.338                                                         | 0.115                                                                 | 1.223                                                                   | 0.709                                                                             |
|                              | 90                    | 02 : 04 : 00         | 554                                                                | 9.41                                                        | -0.001                                                     | 1.436                                                         | 0.124                                                                 | 1.312                                                                   | 0.701                                                                             |
|                              | 90                    | 02 : 44 : 00         | 594                                                                | 10.72                                                       | 0.001                                                      | 1.535                                                         | 0.132                                                                 | 1.403                                                                   | 0.717                                                                             |
|                              | 90                    | 03 : 24 : 00         | 634                                                                | 12.04                                                       | 0.000                                                      | 1.633                                                         | 0.139                                                                 | 1.494                                                                   | 0.714                                                                             |
|                              | 90                    | 04 : 04 : 00         | 674                                                                | 13.36                                                       | 0.002                                                      | 1.732                                                         | 0.146                                                                 | 1.586                                                                   | 0.725                                                                             |
|                              | 90                    | 04 : 44 : 00         | 714                                                                | 14.78                                                       | 0.001                                                      | 1.831                                                         | 0.154                                                                 | 1.678                                                                   | 0.724                                                                             |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| UE                           | 90                    | 05 : 14 : 00         | 744                                                                | 15.88                                                       | 0.003                                                      | 1.905                                                         | 0.159                                                                 | 1.746                                                                   | 0.720                                                                        |
|                              | 90                    | 05 : 16 : 00         | 746                                                                | 15.58                                                       | 0.000                                                      | 1.906                                                         | 0.158                                                                 | 1.748                                                                   | 0.334                                                                        |
|                              | 90                    | 05 : 46 : 00         | 776                                                                | 14.36                                                       | 0.000                                                      | 1.911                                                         | 0.153                                                                 | 1.758                                                                   | 0.096                                                                        |
|                              | 90                    | 06 : 16 : 00         | 806                                                                | 11.66                                                       | -0.001                                                     | 1.896                                                         | 0.142                                                                 | 1.754                                                                   | -0.039                                                                       |
|                              | 90                    | 06 : 46 : 00         | 836                                                                | 9.14                                                        | -0.001                                                     | 1.873                                                         | 0.130                                                                 | 1.743                                                                   | -0.116                                                                       |
|                              | 90                    | 07 : 16 : 00         | 866                                                                | 7.15                                                        | -0.001                                                     | 1.847                                                         | 0.120                                                                 | 1.727                                                                   | -0.164                                                                       |
|                              | 90                    | 07 : 46 : 00         | 896                                                                | 5.57                                                        | 0.000                                                      | 1.819                                                         | 0.110                                                                 | 1.709                                                                   | -0.189                                                                       |
| US                           | 90                    | 08 : 16 : 00         | 926                                                                | 4.35                                                        | -0.002                                                     | 1.788                                                         | 0.100                                                                 | 1.687                                                                   | -0.228                                                                       |
|                              | 90                    | 08 : 46 : 00         | 956                                                                | 3.39                                                        | 0.000                                                      | 1.754                                                         | 0.091                                                                 | 1.663                                                                   | -0.255                                                                       |
|                              | 90                    | 09 : 16 : 00         | 986                                                                | 2.65                                                        | 0.000                                                      | 1.719                                                         | 0.083                                                                 | 1.636                                                                   | -0.286                                                                       |
|                              | 90                    | 09 : 46 : 00         | 1016                                                               | 2.09                                                        | -0.001                                                     | 1.682                                                         | 0.075                                                                 | 1.607                                                                   | -0.304                                                                       |
|                              | 90                    | 10 : 16 : 00         | 1046                                                               | 1.66                                                        | -0.001                                                     | 1.646                                                         | 0.068                                                                 | 1.578                                                                   | -0.307                                                                       |
|                              | 90                    | 10 : 22 : 00         | 1052                                                               | 1.58                                                        | 0.000                                                      | 1.639                                                         | 0.067                                                                 | 1.572                                                                   | -0.310                                                                       |
| UE                           | 90                    | 10 : 24 : 00         | 1054                                                               | 1.58                                                        | 0.000                                                      | 1.637                                                         | 0.067                                                                 | 1.570                                                                   | -0.299                                                                       |
|                              | 90                    | 11 : 26 : 00         | 1116                                                               | 5.05                                                        | 0.003                                                      | 1.732                                                         | 0.106                                                                 | 1.626                                                                   | 0.285                                                                        |
|                              | 90                    | 12 : 28 : 00         | 1178                                                               | 10.70                                                       | 0.002                                                      | 1.860                                                         | 0.138                                                                 | 1.722                                                                   | 0.488                                                                        |
|                              | 90                    | 13 : 30 : 00         | 1240                                                               | 16.10                                                       | 0.003                                                      | 1.994                                                         | 0.160                                                                 | 1.834                                                                   | 0.567                                                                        |
| US                           | 90                    | 14 : 32 : 00         | 1302                                                               | 19.50                                                       | 0.004                                                      | 2.142                                                         | 0.175                                                                 | 1.967                                                                   | 0.675                                                                        |
|                              | 90                    | 15 : 34 : 00         | 1364                                                               | 22.70                                                       | 0.006                                                      | 2.292                                                         | 0.188                                                                 | 2.104                                                                   | 0.696                                                                        |
|                              | 90                    | 16 : 36 : 00         | 1426                                                               | 26.15                                                       | 0.008                                                      | 2.440                                                         | 0.201                                                                 | 2.239                                                                   | 0.688                                                                        |
|                              | 90                    | 17 : 38 : 00         | 1488                                                               | 30.20                                                       | 0.009                                                      | 2.588                                                         | 0.215                                                                 | 2.372                                                                   | 0.676                                                                        |
|                              | 90                    | 18 : 40 : 00         | 1550                                                               | 34.77                                                       | 0.013                                                      | 2.735                                                         | 0.231                                                                 | 2.504                                                                   | 0.669                                                                        |
|                              | 90                    | 19 : 42 : 00         | 1612                                                               | 39.82                                                       | 0.016                                                      | 2.879                                                         | 0.246                                                                 | 2.632                                                                   | 0.652                                                                        |
|                              | 90                    | 20 : 44 : 00         | 1674                                                               | 45.55                                                       | 0.018                                                      | 3.019                                                         | 0.263                                                                 | 2.756                                                                   | 0.628                                                                        |
|                              | 90                    | 21 : 46 : 00         | 1736                                                               | 51.96                                                       | 0.024                                                      | 3.157                                                         | 0.281                                                                 | 2.876                                                                   | 0.609                                                                        |
|                              | 90                    | 22 : 48 : 00         | 1798                                                               | 58.95                                                       | 0.027                                                      | 3.293                                                         | 0.300                                                                 | 2.993                                                                   | 0.595                                                                        |
|                              | 90                    | 23 : 50 : 00         | 1860                                                               | 66.71                                                       | 0.032                                                      | 3.426                                                         | 0.319                                                                 | 3.107                                                                   | 0.576                                                                        |
|                              | 91                    | 00 : 52 : 00         | 1922                                                               | 75.20                                                       | 0.038                                                      | 3.558                                                         | 0.340                                                                 | 3.218                                                                   | 0.567                                                                        |
|                              | 91                    | 01 : 54 : 00         | 1984                                                               | 84.46                                                       | 0.043                                                      | 3.687                                                         | 0.361                                                                 | 3.327                                                                   | 0.551                                                                        |
|                              | 91                    | 02 : 56 : 00         | 2046                                                               | 94.52                                                       | 0.050                                                      | 3.813                                                         | 0.382                                                                 | 3.431                                                                   | 0.529                                                                        |
|                              | 91                    | 03 : 58 : 00         | 2108                                                               | 105.24                                                      | 0.055                                                      | 3.936                                                         | 0.405                                                                 | 3.532                                                                   | 0.513                                                                        |
|                              | 91                    | 05 : 00 : 00         | 2170                                                               | 116.64                                                      | 0.062                                                      | 4.057                                                         | 0.427                                                                 | 3.629                                                                   | 0.495                                                                        |
|                              | 91                    | 06 : 02 : 00         | 2232                                                               | 128.95                                                      | 0.069                                                      | 4.175                                                         | 0.450                                                                 | 3.725                                                                   | 0.485                                                                        |
|                              | 91                    | 07 : 04 : 00         | 2294                                                               | 141.50                                                      | 0.075                                                      | 4.289                                                         | 0.473                                                                 | 3.816                                                                   | 0.462                                                                        |
| UE                           | 91                    | 07 : 26 : 00         | 2316                                                               | 146.33                                                      | 0.080                                                      | 4.330                                                         | 0.482                                                                 | 3.848                                                                   | 0.461                                                                        |
|                              | 91                    | 07 : 28 : 00         | 2318                                                               | 145.89                                                      | 0.057                                                      | 4.331                                                         | 0.481                                                                 | 3.850                                                                   | 0.371                                                                        |
|                              | 91                    | 10 : 06 : 00         | 2476                                                               | 128.38                                                      | -0.003                                                     | 4.339                                                         | 0.453                                                                 | 3.887                                                                   | 0.073                                                                        |
|                              | 91                    | 12 : 44 : 00         | 2634                                                               | 91.53                                                       | -0.013                                                     | 4.256                                                         | 0.387                                                                 | 3.868                                                                   | -0.036                                                                       |
|                              | 91                    | 15 : 22 : 00         | 2792                                                               | 59.41                                                       | -0.022                                                     | 4.155                                                         | 0.322                                                                 | 3.833                                                                   | -0.072                                                                       |
| US                           | 91                    | 18 : 00 : 00         | 2950                                                               | 34.24                                                       | -0.036                                                     | 4.031                                                         | 0.262                                                                 | 3.769                                                                   | -0.126                                                                       |
|                              | 91                    | 20 : 38 : 00         | 3108                                                               | 18.00                                                       | -0.048                                                     | 3.884                                                         | 0.214                                                                 | 3.670                                                                   | -0.198                                                                       |
|                              | 91                    | 23 : 16 : 00         | 3266                                                               | 9.19                                                        | -0.059                                                     | 3.714                                                         | 0.178                                                                 | 3.536                                                                   | -0.267                                                                       |

## CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-3 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD5  
 Task No.: NA Date; Start: 3/28/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.6 Piston Uplift,  $P_{up}$  (lbf): 34.70  
 Project Name: Exelon (Victoria) Completed: 4/1/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Mottled Brownish Yellow and Light Gray Lean CLAY (CL)

Ring No.: 3 Area,  $A_r$  (cm<sup>2</sup>): 31.723 Solids Ht.,  $H_s$  (mm): 10.923 Specific Gravity,  $G_s =$  2.720 ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.05 Water 19.2 Void 0.744 Deg. of 70.2 Total Unit 115.9 Dry Unit 97.2  
**Final:** (mm):  $H_f$ : 16.65 Content,  $w$  (%): 18.8 Ratio,  $e$ : 0.525 Sat.,  $S$  (%): 97.5 Weight,  $\gamma_t$  (pcf): 132.1 Weight,  $\gamma_d$  (pcf): 111.2

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.14                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.25                                                                                                                  | 0.740                              | 0.37                                                    |                                                                |                                                                                         | 19.005                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BE                           |                                                                          | 0.24                                                                    | 0.14                                                                                                                  | 0.742                              | 0.25                                                    | 0.002                                                          | 0.9                                                                                     | 19.025                                                |                                                                           |                                                                     | 0.741                                  |                                                   |                                                                                                     |                                                                                                       |
| CS                           | 0                                                                        | 0.25                                                                    | 0.12                                                                                                                  | 0.742                              | 0.25                                                    | 0.000                                                          | 0.0                                                                                     | 19.029                                                |                                                                           |                                                                     | 0.742                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 20                                                                       | 0.52                                                                    | 0.32                                                                                                                  | 0.739                              | 0.52                                                    | 0.000                                                          | -0.1                                                                                    | 18.990                                                | 0.39                                                                      |                                                                     | 0.740                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 40                                                                       | 0.62                                                                    | 0.59                                                                                                                  | 0.734                              | 0.62                                                    | 0.000                                                          | -0.1                                                                                    | 18.939                                                | 0.57                                                                      |                                                                     | 0.736                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 60                                                                       | 0.70                                                                    | 0.86                                                                                                                  | 0.729                              | 0.70                                                    | 0.000                                                          | 0.0                                                                                     | 18.887                                                | 0.66                                                                      |                                                                     | 0.731                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 80                                                                       | 0.79                                                                    | 1.13                                                                                                                  | 0.724                              | 0.79                                                    | 0.001                                                          | 0.1                                                                                     | 18.837                                                | 0.75                                                                      | 1357.75                                                             | 0.727                                  | 8.03E+00                                          | 290.43                                                                                              |                                                                                                       |
|                              | 114                                                                      | 0.95                                                                    | 1.57                                                                                                                  | 0.717                              | 0.95                                                    | 0.001                                                          | 0.1                                                                                     | 18.752                                                | 0.87                                                                      | 599.57                                                              | 0.721                                  | 3.43E+00                                          | 348.77                                                                                              |                                                                                                       |
|                              | 154                                                                      | 1.21                                                                    | 2.09                                                                                                                  | 0.708                              | 1.21                                                    | 0.001                                                          | 0.1                                                                                     | 18.654                                                | 1.08                                                                      | 839.73                                                              | 0.712                                  | 3.45E+00                                          | 858.65                                                                                              |                                                                                                       |
|                              | 194                                                                      | 1.50                                                                    | 2.60                                                                                                                  | 0.699                              | 1.50                                                    | 0.001                                                          | 0.0                                                                                     | 18.558                                                | 1.35                                                                      | 1048.67                                                             | 0.703                                  | 3.68E+00                                          | 1544.63                                                                                             |                                                                                                       |
|                              | 234                                                                      | 1.91                                                                    | 3.10                                                                                                                  | 0.690                              | 1.91                                                    | 0.000                                                          | 0.0                                                                                     | 18.461                                                | 1.70                                                                      | 1782.95                                                             | 0.694                                  | 4.50E+00                                          | 3445.84                                                                                             |                                                                                                       |
|                              | 274                                                                      | 2.41                                                                    | 3.60                                                                                                                  | 0.681                              | 2.41                                                    | 0.002                                                          | 0.1                                                                                     | 18.367                                                | 2.16                                                                      | 1163.66                                                             | 0.686                                  | 2.31E+00                                          | 2794.72                                                                                             |                                                                                                       |
|                              | 314                                                                      | 3.04                                                                    | 4.08                                                                                                                  | 0.673                              | 3.04                                                    | 0.000                                                          | 0.0                                                                                     | 18.274                                                | 2.73                                                                      | 1387.77                                                             | 0.677                                  | 2.19E+00                                          | 3996.38                                                                                             |                                                                                                       |
|                              | 354                                                                      | 3.82                                                                    | 4.58                                                                                                                  | 0.664                              | 3.82                                                    | 0.000                                                          | 0.0                                                                                     | 18.180                                                | 3.43                                                                      | 4279.20                                                             | 0.669                                  | 5.49E+00                                          | 14409.72                                                                                            |                                                                                                       |
|                              | 394                                                                      | 4.73                                                                    | 5.06                                                                                                                  | 0.656                              | 4.73                                                    | 0.000                                                          | 0.0                                                                                     | 18.088                                                | 4.27                                                                      | 6345.46                                                             | 0.660                                  | 6.86E+00                                          | 24523.57                                                                                            |                                                                                                       |
|                              | 434                                                                      | 5.69                                                                    | 5.49                                                                                                                  | 0.648                              | 5.69                                                    | -0.001                                                         | 0.0                                                                                     | 18.006                                                | 5.21                                                                      |                                                                     | 0.652                                  |                                                   | -24858.66                                                                                           |                                                                                                       |

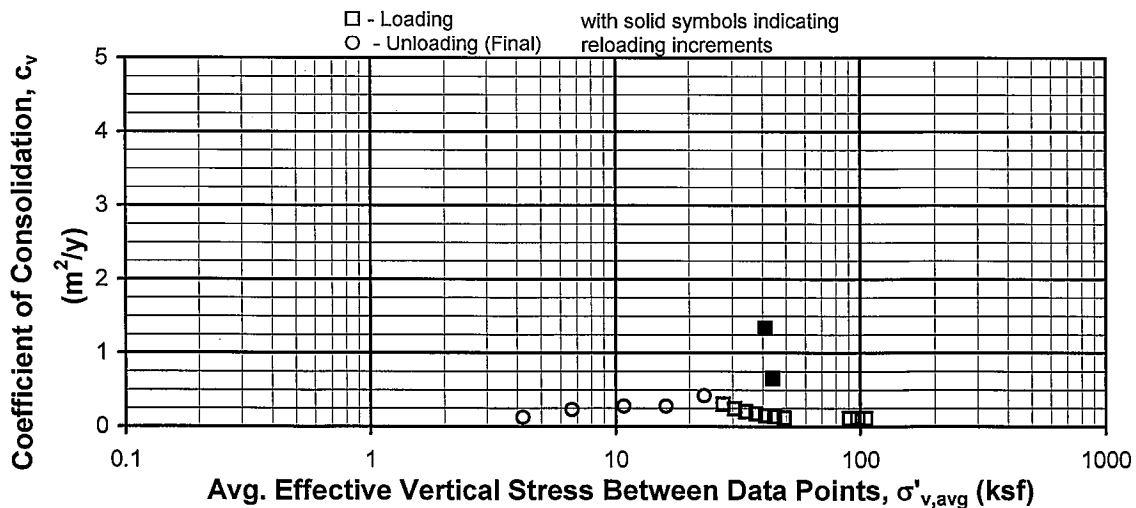
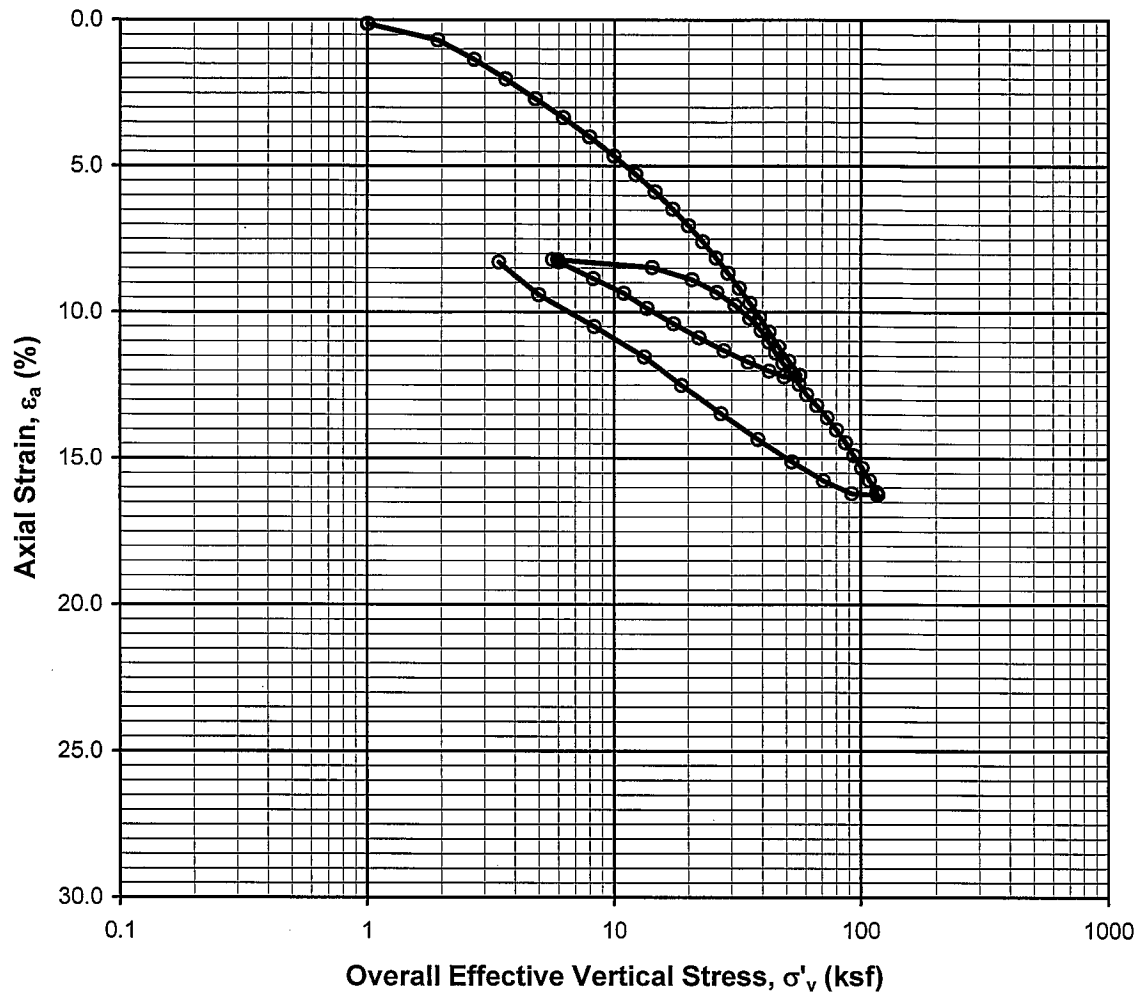
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n} (\varepsilon_{ac,n})$<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n (2)$<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                         | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                         |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k @ 20^\circ C$<br>(m/y) |                                                                                                     |                                                                                                       |
|                              | 474                                                                      | 6.85                                                                    | 5.95                                                                                                                    | 0.640                              | 6.85                                                    | 0.000                                                          | 0.0                                                                                     | 17.919                                                | 6.27                                                                      |                                                             | 0.644                                  |                                                         | -25034.75                                                                                           |                                                                                                       |
|                              | 514                                                                      | 8.13                                                                    | 6.42                                                                                                                    | 0.632                              | 8.13                                                    | 0.000                                                          | 0.0                                                                                     | 17.829                                                | 7.49                                                                      | 61837.69                                                    | 0.636                                  | 4.64E+01                                                | ###                                                                                                 |                                                                                                       |
|                              | 554                                                                      | 9.41                                                                    | 6.89                                                                                                                    | 0.624                              | 9.41                                                    | -0.001                                                         | 0.0                                                                                     | 17.740                                                | 8.77                                                                      |                                                             | 0.628                                  |                                                         | -41130.32                                                                                           |                                                                                                       |
|                              | 594                                                                      | 10.72                                                                   | 7.36                                                                                                                    | 0.616                              | 10.72                                                   | 0.001                                                          | 0.0                                                                                     | 17.649                                                | 10.07                                                                     |                                                             | 0.620                                  |                                                         | ###                                                                                                 |                                                                                                       |
|                              | 634                                                                      | 12.04                                                                   | 7.84                                                                                                                    | 0.607                              | 12.04                                                   | 0.000                                                          | 0.0                                                                                     | 17.558                                                | 11.38                                                                     | 7509.04                                                     | 0.612                                  | 5.53E+00                                                | 52925.59                                                                                            |                                                                                                       |
|                              | 674                                                                      | 13.36                                                                   | 8.32                                                                                                                    | 0.599                              | 13.36                                                   | 0.002                                                          | 0.0                                                                                     | 17.466                                                | 12.70                                                                     | 2869.13                                                     | 0.603                                  | 2.14E+00                                                | 21857.94                                                                                            |                                                                                                       |
|                              | 714                                                                      | 14.77                                                                   | 8.81                                                                                                                    | 0.591                              | 14.78                                                   | 0.001                                                          | 0.0                                                                                     | 17.374                                                | 14.07                                                                     | 2054.82                                                     | 0.595                                  | 1.44E+00                                                | 16850.84                                                                                            |                                                                                                       |
| UE                           | 744                                                                      | 15.88                                                                   | 9.17                                                                                                                    | 0.584                              | 15.88                                                   | 0.003                                                          | 0.0                                                                                     | 17.306                                                | 15.33                                                                     | 1525.73                                                     | 0.587                                  | 1.02E+00                                                | 13207.36                                                                                            |                                                                                                       |
|                              | 746                                                                      | 15.58                                                                   | 9.18                                                                                                                    | 0.584                              | 15.58                                                   | 0.000                                                          | 0.0                                                                                     | 17.304                                                | 15.73                                                                     |                                                             | 0.584                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 776                                                                      | 14.36                                                                   | 9.23                                                                                                                    | 0.583                              | 14.36                                                   | 0.000                                                          | 0.0                                                                                     | 17.294                                                | 14.97                                                                     |                                                             | 0.584                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 806                                                                      | 11.67                                                                   | 9.21                                                                                                                    | 0.584                              | 11.66                                                   | -0.001                                                         | 0.0                                                                                     | 17.298                                                | 13.01                                                                     |                                                             | 0.583                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 836                                                                      | 9.14                                                                    | 9.15                                                                                                                    | 0.585                              | 9.14                                                    | -0.001                                                         | 0.0                                                                                     | 17.309                                                | 10.40                                                                     |                                                             | 0.584                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 866                                                                      | 7.15                                                                    | 9.07                                                                                                                    | 0.586                              | 7.15                                                    | -0.001                                                         | 0.0                                                                                     | 17.325                                                | 8.15                                                                      |                                                             | 0.585                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 896                                                                      | 5.57                                                                    | 8.97                                                                                                                    | 0.588                              | 5.57                                                    | 0.000                                                          | 0.0                                                                                     | 17.343                                                | 6.36                                                                      |                                                             | 0.587                                  |                                                         |                                                                                                     |                                                                                                       |
| US                           | 926                                                                      | 4.35                                                                    | 8.86                                                                                                                    | 0.590                              | 4.35                                                    | -0.002                                                         | 0.0                                                                                     | 17.365                                                | 4.96                                                                      |                                                             | 0.589                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 956                                                                      | 3.39                                                                    | 8.73                                                                                                                    | 0.592                              | 3.39                                                    | 0.000                                                          | 0.0                                                                                     | 17.389                                                | 3.87                                                                      | 2717.99                                                     | 0.591                                  | 7.35E-01                                                | 1027.57                                                                                             |                                                                                                       |
|                              | 986                                                                      | 2.65                                                                    | 8.59                                                                                                                    | 0.594                              | 2.65                                                    | 0.000                                                          | 0.0                                                                                     | 17.416                                                | 3.02                                                                      | 18483.78                                                    | 0.593                                  | 7.25E+00                                                | 13934.75                                                                                            |                                                                                                       |
|                              | 1016                                                                     | 2.09                                                                    | 8.43                                                                                                                    | 0.597                              | 2.09                                                    | -0.001                                                         | 0.0                                                                                     | 17.445                                                | 2.37                                                                      | 3166.75                                                     | 0.596                                  | 1.75E+00                                                | 3569.54                                                                                             |                                                                                                       |
|                              | 1046                                                                     | 1.66                                                                    | 8.28                                                                                                                    | 0.600                              | 1.66                                                    | -0.001                                                         | 0.0                                                                                     | 17.474                                                | 1.88                                                                      | 1551.74                                                     | 0.598                                  | 1.11E+00                                                | 2324.38                                                                                             |                                                                                                       |
|                              | 1052                                                                     | 1.58                                                                    | 8.25                                                                                                                    | 0.600                              | 1.58                                                    | 0.000                                                          | 0.0                                                                                     | 17.480                                                | 1.62                                                                      | 2311.38                                                     | 0.600                                  | 1.83E+00                                                | 3628.06                                                                                             |                                                                                                       |
| UE                           | 1054                                                                     | 1.58                                                                    | 8.24                                                                                                                    | 0.600                              | 1.58                                                    | 0.000                                                          | 0.0                                                                                     | 17.482                                                | 1.58                                                                      | 3185.49                                                     | 0.600                                  | -2.89E+01                                               | 5077.20                                                                                             |                                                                                                       |
|                              | 1116                                                                     | 5.05                                                                    | 8.53                                                                                                                    | 0.595                              | 5.05                                                    | 0.003                                                          | 0.1                                                                                     | 17.426                                                | 3.31                                                                      |                                                             | 0.598                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 1178                                                                     | 10.70                                                                   | 9.04                                                                                                                    | 0.587                              | 10.70                                                   | 0.002                                                          | 0.0                                                                                     | 17.330                                                | 7.88                                                                      |                                                             | 0.591                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 1240                                                                     | 16.10                                                                   | 9.62                                                                                                                    | 0.576                              | 16.10                                                   | 0.003                                                          | 0.0                                                                                     | 17.218                                                | 13.40                                                                     |                                                             | 0.581                                  |                                                         |                                                                                                     |                                                                                                       |
| US                           | 1302                                                                     | 19.50                                                                   | 10.32                                                                                                                   | 0.564                              | 19.50                                                   | 0.004                                                          | 0.0                                                                                     | 17.085                                                | 17.80                                                                     |                                                             | 0.570                                  |                                                         |                                                                                                     |                                                                                                       |
|                              | 1364                                                                     | 22.70                                                                   | 11.04                                                                                                                   | 0.552                              | 22.70                                                   | 0.006                                                          | 0.0                                                                                     | 16.948                                                | 21.10                                                                     | 766.76                                                      | 0.558                                  | 3.51E-01                                                | 624.70                                                                                              |                                                                                                       |
|                              | 1426                                                                     | 26.14                                                                   | 11.75                                                                                                                   | 0.539                              | 26.15                                                   | 0.008                                                          | 0.0                                                                                     | 16.813                                                | 24.42                                                                     | 557.63                                                      | 0.545                                  | 2.35E-01                                                | 923.37                                                                                              |                                                                                                       |
|                              | 1488                                                                     | 30.20                                                                   | 12.45                                                                                                                   | 0.527                              | 30.20                                                   | 0.009                                                          | 0.0                                                                                     | 16.680                                                | 28.17                                                                     | 563.49                                                      | 0.533                                  | 1.98E-01                                                | 1422.15                                                                                             |                                                                                                       |
|                              | 1550                                                                     | 34.76                                                                   | 13.14                                                                                                                   | 0.515                              | 34.77                                                   | 0.013                                                          | 0.0                                                                                     | 16.548                                                | 32.48                                                                     | 488.47                                                      | 0.521                                  | 1.51E-01                                                | 1670.05                                                                                             |                                                                                                       |
|                              | 1612                                                                     | 39.81                                                                   | 13.82                                                                                                                   | 0.503                              | 39.82                                                   | 0.016                                                          | 0.0                                                                                     | 16.420                                                | 37.28                                                                     | 398.61                                                      | 0.509                                  | 1.08E-01                                                | 1730.51                                                                                             |                                                                                                       |

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1-D CONSOLIDATION TEST: CRS  
Sample No. UD-6A - Depth 28.5 - 30.2 ft  
Boring B-2321UD

KAW 7/16/08



# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2321\_UD6a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas.; ☐ Assumed Ring No.: 8  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.686  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                          |                                           |                                |                                   |                                  |                                           |                         |
|------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                     | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-6                         | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 28.5 - 30.2                  | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{nl}$ (%) =           | Dia. (in.) =            |
| Spec. Selection by X-ray;                | <input type="checkbox"/> Geomarine Sample |                                |                                   | Ref. Effort =                    | % Comp. =                                 | $\pm$ Opt. =            |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                               | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                    |                                | Mass Moist Soil + Ring (g)                           | 330.74  | 331.27 |
| Container No.                                            | 116                         | 785              | 819                                           | 189                            | Mass Ring (g)                                        | 214.27  |        |
| Mass Moist Soil + Container (g)                          | 115.13                      | 125.75           | 109.39                                        | 64.72                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 116.47  | 117.00 |
| Mass Dry Soil + Container (g)                            | 98.86                       | 107.59           | 94.26                                         | 57.51                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 29.69                       | 31.96            | 31.98                                         | 30.39                          | Container No.                                        | 501     |        |
| WATER CONTENT (%)                                        | 23.52                       | 24.01            | 24.29                                         | 26.59                          | Mass Dry Soil + Container (g)                        | 32.07   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 23.94                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> X Slice ; | Whole Spec.                    | Mass Container (g)                                   | 31.82   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                               |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.25    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                          |                                             |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                          | Final                                       |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.060 |
| with Spec.                                                                                                                                                                   | without Spec.                            | with Spec.                                  | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.300                                                                                                                                                                       | 0.000                                    | 12.290                                      | 13.040                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.260                                                              | 12.284 |
| 19.210                                                                                                                                                                       | 0.000                                    | 12.290                                      | 12.980                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 12.988 |
| 19.250                                                                                                                                                                       | 0.000                                    | 12.320                                      | 12.980                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.260                                                              | 18.356 |
| 19.290                                                                                                                                                                       | 0.000                                    | 12.280                                      | 12.980                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.250                                                                                                                                                                       | 0.000                                    | 12.240                                      | 12.960                      | Initial Height, $H_o$                                   |  | 19.260                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> X No | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> X No | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                          |                                             |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 18.356                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                          |                                             |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | -3.61                                                               |        |

| Estimated Initial Unit Weight                                                                           |        | Soil Extruded During Loading                            |      |
|---------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                                           | 119.14 | Container No.                                           |      |
| Dry, $\gamma_{d,o}$ (pcf) =                                                                             | 96.13  | Mass Dry Soil + Cont. (g)                               | NA   |
| Filter Paper Used: <input checked="" type="checkbox"/> X Whatman No. 54; <input type="checkbox"/> Other |        | Mass Cont. (g)                                          | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No              |        | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |
| CRS Test: Top Only: <input checked="" type="checkbox"/> X Yes ; <input type="checkbox"/> No             |        |                                                         |      |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/26/2008 Date: 3/26/2008 Final Calc. By: LF Date: 4/1/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2321 UD6a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 23.52                    | 94.29                    | 84.5                         | 97.1                  | 107.1 |
| 2                | " Bottom, W2          | 24.01                    | 93.92                    | 85.5                         | 98.1                  | 108.2 |
| 3                | " Sides, W3           | 24.29                    | 93.71                    | 86.0                         | 98.7                  | 108.8 |
| 4                | " Average, W4         | 23.94                    | 93.97                    | 85.3                         | 98.0                  | 108.0 |
| 5                | " Back Calculated (1) | 25.67                    | 92.68 (3)                | 88.6                         | 101.4                 | 111.6 |
| 6                | Final                 | 26.59                    | 92.68 (2)                | 88.6                         | 101.4                 | 111.6 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. 5                                                                                     | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = 2.747                                                                                     |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.734                                                     |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_s$                                                                | 0.11624 |
| Final Selected, $K_r$                                                           | 0.11624 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 93.21                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 92.94                                                 |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                                  |                                                                        |          |  |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|----------|--|
| Specific Gravity<br>G <sub>s</sub> = 2.720 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                                  |                                                                        |          |  |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                  |                                                                        |          |  |
| Mass Dry Soil, (g)                         | Initial:             | 92.68         | X                           | From Cal. Routine No.                   | 5                                                                                        | Note: Routine #5 is based on final measurements. |                                                                        |          |  |
|                                            | Final (4):           | NA            |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%    |                                                                        |          |  |
| Initial Height (mm) =                      |                      |               | 19.26                       | X                                       | Measured ;                                                                               |                                                  | Back Calculated Back-cal. Sat. (%) = NA                                |          |  |
| Final Height (mm) =                        |                      |               | 18.36                       | X                                       | Measured ;                                                                               |                                                  | Initial H <sub>o</sub> & dial change during loading                    |          |  |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm)      | Extruded soil loss proportioned in increasing loading increments (5) : |          |  |
| Initial                                    | 25.7                 | 0.788         | 88.6                        | 119.1                                   | 94.8                                                                                     | 10.773                                           | From                                                                   | To (ksf) |  |
| Final                                      | 26.2                 | 0.704         | 101.4                       | 125.6                                   | 99.5                                                                                     | NA                                               | NA                                                                     | NA       |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 75 | Minus 200 (%) |
| Casagrande Method      | 16.00             | NA                                | 0.125 | 0.040 | 4.2 | Plastic Limit (PL)    | 20 | 94.7          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 55 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP HP

Date: 4/1/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686      Test Station No.: CRS-8      File Name: B-2321\_UD6a  
 Task No.: NA      Date; Start: 3/26/2008      Initial Height,  $H_o$  (mm): 19.26  
 Project Name: Exelon (Victoria)      Completed: 4/1/2008      Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6861  
 Test: Initial / Pressure      Gauge Back Pressure,  $U_G$  (psi): 70      ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values:      Back Pressure,  $U_{b,BE}$  (psi): 69.89043 ,V: 0.023156316      Piston Uplift,  $P_{up}$  (lbf): 34.32  
                                  Back Pressure,  $U_{b,CS}$  (psi): 69.89295 ,V: 0.023157152      Setup  $DT_{ref}$  (V): 0.002053076  
 Displacement Transducer No.: DT-108      Calib. Factor (mm/V): 227.98906      Ch. No.: 2  
 Pore Press. Transducer No.: PT-116      Calib. Factor (psi/V): 3007.15024      Ref. Zero (V): -0.000085      Ch. No.: 3  
 Force Cell No.: FT-108      Calib. Factor (lbf/V): -156066.76      Ref. Zero (V): 0.000015      Ch. No.: 1

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
     US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF      Reviewed By: HP

**Remarks:**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 86                    | 13 : 31 : 11         |                                                                    | 0.23                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 86                    | 14 : 24 : 53         |                                                                    | 1.01                                                        |                                                            | 0.039                                                         | 0.000                                                                 | 0.039                                                                   |                                                                              |
| BE                           | 87                    | 12 : 02 : 15         |                                                                    | 1.01                                                        | 0.000                                                      | 0.026                                                         | 0.000                                                                 | 0.026                                                                   |                                                                              |
| CS                           | 87                    | 12 : 02 : 18         | 0                                                                  | 1.00                                                        | 0.000                                                      | 0.026                                                         | 0.000                                                                 | 0.026                                                                   |                                                                              |
|                              | 87                    | 13 : 11 : 08         | 69                                                                 | 1.92                                                        | -0.008                                                     | 0.132                                                         | 0.000                                                                 | 0.132                                                                   | 0.480                                                                        |
|                              | 87                    | 14 : 21 : 10         | 139                                                                | 2.71                                                        | -0.016                                                     | 0.262                                                         | 0.000                                                                 | 0.262                                                                   | 0.578                                                                        |
|                              | 87                    | 15 : 31 : 12         | 209                                                                | 3.65                                                        | -0.022                                                     | 0.390                                                         | 0.000                                                                 | 0.390                                                                   | 0.570                                                                        |
|                              | 87                    | 16 : 41 : 12         | 279                                                                | 4.83                                                        | -0.012                                                     | 0.521                                                         | 0.000                                                                 | 0.521                                                                   | 0.580                                                                        |
|                              | 87                    | 17 : 51 : 14         | 349                                                                | 6.29                                                        | 0.019                                                      | 0.645                                                         | 0.000                                                                 | 0.645                                                                   | 0.553                                                                        |
|                              | 87                    | 19 : 01 : 17         | 419                                                                | 8.08                                                        | 0.139                                                      | 0.772                                                         | 0.000                                                                 | 0.772                                                                   | 0.564                                                                        |
|                              | 87                    | 20 : 11 : 18         | 489                                                                | 10.41                                                       | 0.580                                                      | 0.897                                                         | 0.000                                                                 | 0.897                                                                   | 0.557                                                                        |
|                              | 87                    | 21 : 21 : 21         | 559                                                                | 13.27                                                       | 1.483                                                      | 1.019                                                         | 0.000                                                                 | 1.019                                                                   | 0.541                                                                        |
|                              | 87                    | 22 : 31 : 22         | 629                                                                | 16.85                                                       | 3.143                                                      | 1.133                                                         | 0.000                                                                 | 1.133                                                                   | 0.508                                                                        |
| US                           | 87                    | 23 : 41 : 24         | 699                                                                | 21.17                                                       | 5.556                                                      | 1.247                                                         | 0.000                                                                 | 1.247                                                                   | 0.509                                                                        |
|                              | 88                    | 00 : 51 : 26         | 769                                                                | 26.28                                                       | 8.785                                                      | 1.357                                                         | 0.000                                                                 | 1.357                                                                   | 0.489                                                                        |
|                              | 88                    | 02 : 01 : 28         | 839                                                                | 32.01                                                       | 12.728                                                     | 1.462                                                         | 0.000                                                                 | 1.462                                                                   | 0.466                                                                        |
|                              | 88                    | 03 : 11 : 29         | 909                                                                | 38.32                                                       | 17.082                                                     | 1.568                                                         | 0.000                                                                 | 1.568                                                                   | 0.474                                                                        |
|                              | 88                    | 04 : 21 : 32         | 979                                                                | 45.12                                                       | 21.888                                                     | 1.669                                                         | 0.000                                                                 | 1.669                                                                   | 0.450                                                                        |
|                              | 88                    | 05 : 31 : 34         | 1049                                                               | 52.25                                                       | 26.987                                                     | 1.769                                                         | 0.000                                                                 | 1.769                                                                   | 0.444                                                                        |
|                              | 88                    | 06 : 41 : 36         | 1119                                                               | 59.80                                                       | 32.409                                                     | 1.867                                                         | 0.000                                                                 | 1.867                                                                   | 0.436                                                                        |
|                              | 88                    | 07 : 51 : 38         | 1189                                                               | 67.62                                                       | 37.993                                                     | 1.962                                                         | 0.000                                                                 | 1.962                                                                   | 0.421                                                                        |
|                              | 88                    | 09 : 01 : 40         | 1259                                                               | 75.70                                                       | 43.717                                                     | 2.056                                                         | 0.000                                                                 | 2.056                                                                   | 0.420                                                                        |
|                              | 88                    | 10 : 11 : 42         | 1329                                                               | 84.11                                                       | 49.394                                                     | 2.154                                                         | 0.000                                                                 | 2.154                                                                   | 0.435                                                                        |
|                              | 88                    | 11 : 21 : 44         | 1399                                                               | 92.43                                                       | 54.207                                                     | 2.249                                                         | 0.000                                                                 | 2.249                                                                   | 0.423                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| UE                           | 88                    | 12 : 25 : 46         | 1463                                                               | 98.84                                                       | 55.701                                                     | 2.342                                                         | 0.000                                                                 | 2.342                                                                   | 0.453                                                                        |
|                              | 88                    | 12 : 26 : 46         | 1464                                                               | 98.56                                                       | 55.574                                                     | 2.343                                                         | 0.000                                                                 | 2.343                                                                   | 0.384                                                                        |
|                              | 88                    | 14 : 36 : 50         | 1595                                                               | 68.28                                                       | 26.645                                                     | 2.353                                                         | 0.000                                                                 | 2.353                                                                   | 0.022                                                                        |
|                              | 88                    | 16 : 46 : 54         | 1725                                                               | 49.94                                                       | 10.607                                                     | 2.315                                                         | 0.000                                                                 | 2.315                                                                   | -0.091                                                                       |
|                              | 88                    | 18 : 56 : 58         | 1855                                                               | 37.14                                                       | 3.247                                                      | 2.255                                                         | 0.000                                                                 | 2.255                                                                   | -0.143                                                                       |
|                              | 88                    | 21 : 07 : 02         | 1985                                                               | 27.40                                                       | -0.790                                                     | 2.180                                                         | 0.000                                                                 | 2.180                                                                   | -0.179                                                                       |
|                              | 88                    | 23 : 17 : 05         | 2115                                                               | 19.94                                                       | -3.357                                                     | 2.095                                                         | 0.000                                                                 | 2.095                                                                   | -0.204                                                                       |
| US                           | 89                    | 01 : 27 : 09         | 2245                                                               | 14.27                                                       | -5.027                                                     | 2.002                                                         | 0.000                                                                 | 2.002                                                                   | -0.223                                                                       |
|                              | 89                    | 03 : 37 : 13         | 2375                                                               | 9.84                                                        | -6.182                                                     | 1.902                                                         | 0.000                                                                 | 1.902                                                                   | -0.239                                                                       |
|                              | 89                    | 05 : 47 : 17         | 2505                                                               | 6.90                                                        | -6.941                                                     | 1.803                                                         | 0.000                                                                 | 1.803                                                                   | -0.236                                                                       |
|                              | 89                    | 07 : 57 : 21         | 2635                                                               | 4.18                                                        | -7.459                                                     | 1.706                                                         | 0.000                                                                 | 1.706                                                                   | -0.234                                                                       |
| UE                           | 89                    | 10 : 07 : 24         | 2765                                                               | 2.17                                                        | -7.851                                                     | 1.597                                                         | 0.000                                                                 | 1.597                                                                   | -0.260                                                                       |
|                              | 89                    | 10 : 25 : 12         | 2783                                                               | 1.91                                                        | -7.895                                                     | 1.582                                                         | 0.000                                                                 | 1.582                                                                   | -0.271                                                                       |
|                              | 89                    | 10 : 27 : 25         | 2785                                                               | 2.10                                                        | -7.901                                                     | 1.581                                                         | 0.000                                                                 | 1.581                                                                   | -0.132                                                                       |
|                              | 89                    | 11 : 27 : 26         | 2845                                                               | 9.73                                                        | -7.622                                                     | 1.632                                                         | 0.000                                                                 | 1.632                                                                   | 0.269                                                                        |
|                              | 89                    | 12 : 27 : 28         | 2905                                                               | 16.35                                                       | -6.932                                                     | 1.712                                                         | 0.000                                                                 | 1.712                                                                   | 0.411                                                                        |
|                              | 89                    | 13 : 27 : 29         | 2965                                                               | 22.37                                                       | -5.809                                                     | 1.796                                                         | 0.000                                                                 | 1.796                                                                   | 0.440                                                                        |
|                              | 89                    | 14 : 27 : 31         | 3025                                                               | 28.33                                                       | -4.022                                                     | 1.882                                                         | 0.000                                                                 | 1.882                                                                   | 0.442                                                                        |
|                              | 89                    | 15 : 27 : 33         | 3085                                                               | 34.75                                                       | -1.116                                                     | 1.967                                                         | 0.000                                                                 | 1.967                                                                   | 0.445                                                                        |
| US                           | 89                    | 16 : 27 : 35         | 3145                                                               | 41.85                                                       | 3.652                                                      | 2.048                                                         | 0.000                                                                 | 2.048                                                                   | 0.417                                                                        |
|                              | 89                    | 17 : 27 : 36         | 3205                                                               | 49.93                                                       | 10.755                                                     | 2.123                                                         | 0.000                                                                 | 2.123                                                                   | 0.389                                                                        |
|                              | 89                    | 18 : 27 : 39         | 3265                                                               | 58.90                                                       | 19.310                                                     | 2.193                                                         | 0.000                                                                 | 2.193                                                                   | 0.367                                                                        |
|                              | 89                    | 19 : 27 : 40         | 3325                                                               | 68.66                                                       | 27.910                                                     | 2.262                                                         | 0.000                                                                 | 2.262                                                                   | 0.354                                                                        |
|                              | 89                    | 20 : 27 : 42         | 3385                                                               | 78.64                                                       | 35.988                                                     | 2.333                                                         | 0.000                                                                 | 2.333                                                                   | 0.368                                                                        |
|                              | 89                    | 21 : 27 : 45         | 3445                                                               | 88.51                                                       | 43.530                                                     | 2.400                                                         | 0.000                                                                 | 2.400                                                                   | 0.353                                                                        |
|                              | 89                    | 22 : 27 : 46         | 3505                                                               | 98.59                                                       | 51.095                                                     | 2.470                                                         | 0.000                                                                 | 2.470                                                                   | 0.361                                                                        |
|                              | 89                    | 23 : 27 : 48         | 3566                                                               | 107.42                                                      | 54.979                                                     | 2.542                                                         | 0.000                                                                 | 2.542                                                                   | 0.374                                                                        |
|                              | 90                    | 00 : 27 : 49         | 3626                                                               | 114.76                                                      | 55.950                                                     | 2.621                                                         | 0.000                                                                 | 2.621                                                                   | 0.409                                                                        |
|                              | 90                    | 01 : 27 : 50         | 3686                                                               | 121.63                                                      | 56.537                                                     | 2.702                                                         | 0.000                                                                 | 2.702                                                                   | 0.419                                                                        |
|                              | 90                    | 02 : 27 : 52         | 3746                                                               | 128.74                                                      | 56.973                                                     | 2.787                                                         | 0.000                                                                 | 2.787                                                                   | 0.442                                                                        |
|                              | 90                    | 03 : 27 : 55         | 3806                                                               | 135.77                                                      | 57.413                                                     | 2.870                                                         | 0.000                                                                 | 2.870                                                                   | 0.433                                                                        |
|                              | 90                    | 04 : 27 : 57         | 3866                                                               | 143.18                                                      | 57.969                                                     | 2.951                                                         | 0.000                                                                 | 2.951                                                                   | 0.421                                                                        |
| UE                           | 90                    | 05 : 27 : 58         | 3926                                                               | 150.50                                                      | 58.365                                                     | 3.034                                                         | 0.000                                                                 | 3.034                                                                   | 0.427                                                                        |
|                              | 90                    | 06 : 28 : 00         | 3986                                                               | 157.82                                                      | 58.582                                                     | 3.112                                                         | 0.000                                                                 | 3.112                                                                   | 0.408                                                                        |
|                              | 90                    | 06 : 41 : 04         | 3999                                                               | 159.59                                                      | 58.945                                                     | 3.129                                                         | 0.000                                                                 | 3.129                                                                   | 0.402                                                                        |
|                              | 90                    | 06 : 43 : 01         | 4001                                                               | 159.07                                                      | 58.684                                                     | 3.132                                                         | 0.000                                                                 | 3.132                                                                   | 0.412                                                                        |
|                              | 90                    | 10 : 48 : 07         | 4246                                                               | 106.24                                                      | 20.040                                                     | 3.120                                                         | 0.000                                                                 | 3.120                                                                   | -0.015                                                                       |
|                              | 90                    | 14 : 53 : 15         | 4491                                                               | 74.13                                                       | 4.580                                                      | 3.035                                                         | 0.000                                                                 | 3.035                                                                   | -0.107                                                                       |
|                              | 90                    | 18 : 58 : 22         | 4736                                                               | 51.55                                                       | -2.028                                                     | 2.912                                                         | 0.000                                                                 | 2.912                                                                   | -0.156                                                                       |
|                              | 90                    | 23 : 03 : 28         | 4981                                                               | 34.87                                                       | -5.365                                                     | 2.765                                                         | 0.000                                                                 | 2.765                                                                   | -0.188                                                                       |
| US                           | 91                    | 03 : 08 : 36         | 5226                                                               | 22.56                                                       | -7.214                                                     | 2.594                                                         | 0.000                                                                 | 2.594                                                                   | -0.217                                                                       |
|                              | 91                    | 07 : 13 : 43         | 5471                                                               | 13.72                                                       | -8.286                                                     | 2.408                                                         | 0.000                                                                 | 2.408                                                                   | -0.236                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-8 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD6  
 Task No.: NA Date, Start: 3/26/2008 Back Pressure,  $U_{b,CS}$  (psi): 69.9 Piston Uplift,  $P_{up}$  (lbf): 34.32  
 Project Name: Exelon (Victoria) Completed: 4/1/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Ring No.: 8 Area,  $A_r$  (cm<sup>2</sup>): 31.686 Solids Ht.,  $H_s$  (mm): 10.773 Specific Gravity,  $G_s =$  2.720 ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.26 Water 25.7 Void 0.788 Deg. of 88.6 Total Unit 119.1 Dry Unit 94.8  
**Final:** (mm):  $H_f$ : 18.36 Content,  $w$  (%): 26.2 Ratio,  $e$ : 0.704 Sat.,  $S$  (%): 101.4 Weight,  $\gamma_t$  (pcf): 125.6 Weight,  $\gamma_d$  (pcf): 99.5

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to errati
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP 

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.23                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.20                                                                                                                  | 0.784                              | 1.01                                                    |                                                                |                                                                                         | 19.221                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BE                           |                                                                          | 1.01                                                                    | 0.14                                                                                                                  | 0.785                              | 1.01                                                    | 0.000                                                          | 0.0                                                                                     | 19.234                                                |                                                                           |                                                                     | 0.785                                  |                                                   |                                                                                                     |                                                                                                       |
| CS                           | 0                                                                        | 1.00                                                                    | 0.14                                                                                                                  | 0.785                              | 1.00                                                    | 0.000                                                          | 0.0                                                                                     | 19.234                                                |                                                                           |                                                                     | 0.785                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 69                                                                       | 1.93                                                                    | 0.69                                                                                                                  | 0.776                              | 1.92                                                    | -0.008                                                         | -0.4                                                                                    | 19.128                                                | 1.47                                                                      |                                                                     | 0.781                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 139                                                                      | 2.72                                                                    | 1.36                                                                                                                  | 0.764                              | 2.71                                                    | -0.016                                                         | -0.6                                                                                    | 18.998                                                | 2.32                                                                      |                                                                     | 0.770                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 209                                                                      | 3.66                                                                    | 2.03                                                                                                                  | 0.752                              | 3.65                                                    | -0.022                                                         | -0.6                                                                                    | 18.870                                                | 3.19                                                                      |                                                                     | 0.758                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 279                                                                      | 4.84                                                                    | 2.70                                                                                                                  | 0.740                              | 4.83                                                    | -0.012                                                         | -0.2                                                                                    | 18.739                                                | 4.25                                                                      |                                                                     | 0.746                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 349                                                                      | 6.27                                                                    | 3.35                                                                                                                  | 0.728                              | 6.29                                                    | 0.019                                                          | 0.3                                                                                     | 18.615                                                | 5.56                                                                      |                                                                     | 0.734                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 419                                                                      | 7.99                                                                    | 4.01                                                                                                                  | 0.716                              | 8.08                                                    | 0.139                                                          | 1.7                                                                                     | 18.488                                                | 7.13                                                                      |                                                                     | 0.722                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 489                                                                      | 10.01                                                                   | 4.66                                                                                                                  | 0.705                              | 10.41                                                   | 0.580                                                          | 5.6                                                                                     | 18.363                                                | 9.00                                                                      |                                                                     | 0.710                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 559                                                                      | 12.26                                                                   | 5.29                                                                                                                  | 0.693                              | 13.27                                                   | 1.483                                                          | 11.2                                                                                    | 18.241                                                | 11.14                                                                     |                                                                     | 0.699                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 629                                                                      | 14.68                                                                   | 5.88                                                                                                                  | 0.683                              | 16.85                                                   | 3.143                                                          | 18.7                                                                                    | 18.127                                                | 13.47                                                                     |                                                                     | 0.688                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 699                                                                      | 17.28                                                                   | 6.47                                                                                                                  | 0.672                              | 21.17                                                   | 5.556                                                          | 26.2                                                                                    | 18.013                                                | 15.98                                                                     |                                                                     | 0.677                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 769                                                                      | 20.03                                                                   | 7.05                                                                                                                  | 0.662                              | 26.28                                                   | 8.785                                                          | 33.4                                                                                    | 17.903                                                | 18.66                                                                     |                                                                     | 0.667                                  |                                                   | 0.60                                                                                                |                                                                                                       |
|                              | 839                                                                      | 22.83                                                                   | 7.59                                                                                                                  | 0.652                              | 32.01                                                   | 12.728                                                         | 39.8                                                                                    | 17.798                                                | 21.43                                                                     |                                                                     | 0.657                                  |                                                   | 0.86                                                                                                |                                                                                                       |
|                              | 909                                                                      | 25.86                                                                   | 8.14                                                                                                                  | 0.642                              | 38.32                                                   | 17.082                                                         | 44.6                                                                                    | 17.692                                                | 24.35                                                                     |                                                                     | 0.647                                  |                                                   | 0.98                                                                                                |                                                                                                       |

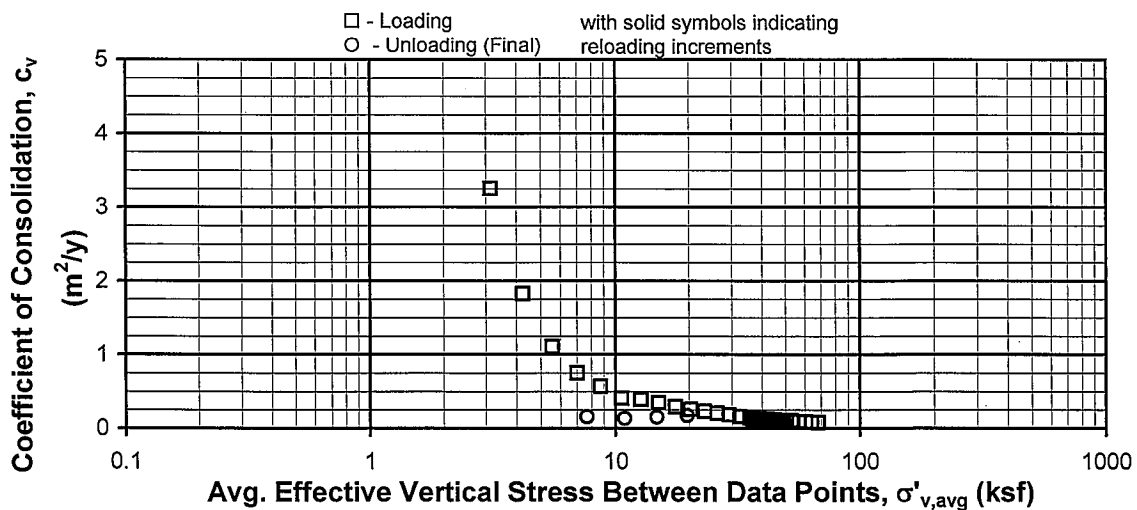
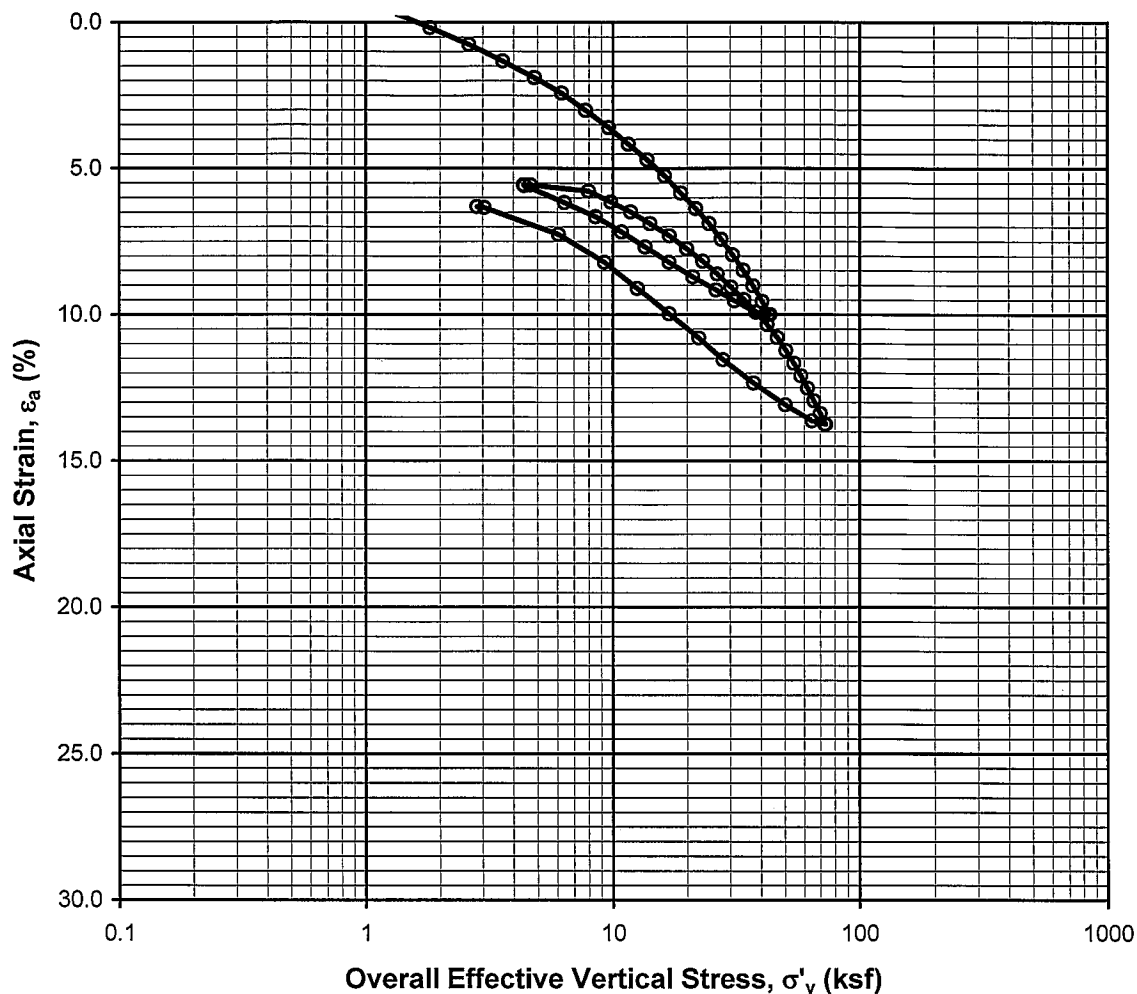


# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

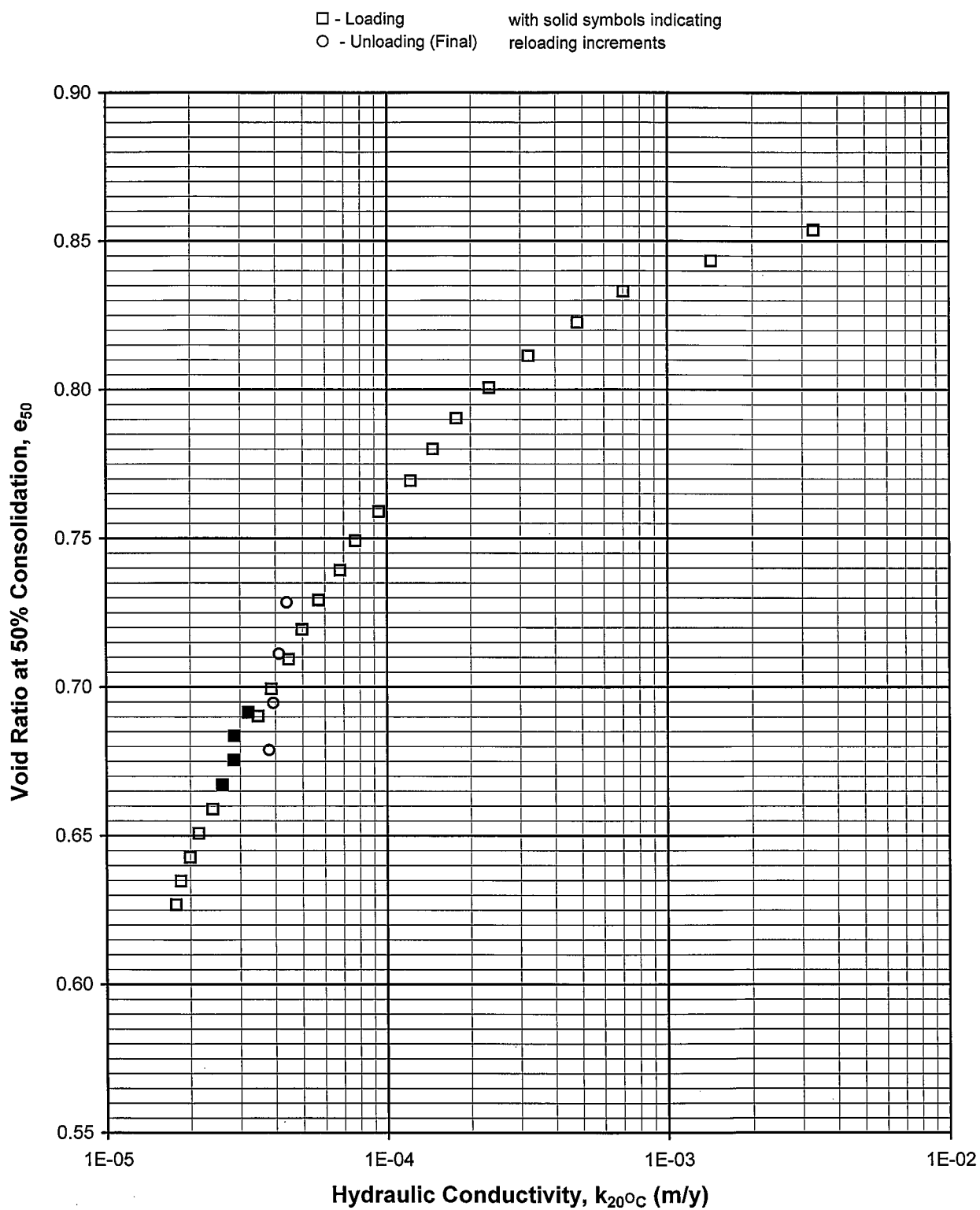
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$c_v \cdot t_n \cdot UCF$<br>$T_v \cdot (H_{c,avg})^2$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                  |                                                                                                       |
|                              | 979                                                                      | 28.99                                                                   | 8.67                                                                                                                        | 0.633                              | 45.12                                                   | 21.888                                                         | 48.5                                                                                    | 17.591                                                | 27.42                                                                     | 0.30                                                        | 0.638                                  | 7.26E-05                                          | 1.04                                                                                             |                                                                                                       |
|                              | 1049                                                                     | 32.19                                                                   | 9.19                                                                                                                        | 0.624                              | 52.25                                                   | 26.987                                                         | 51.6                                                                                    | 17.491                                                | 30.59                                                                     | 0.24                                                        | 0.628                                  | 5.74E-05                                          | 1.05                                                                                             |                                                                                                       |
|                              | 1119                                                                     | 35.54                                                                   | 9.70                                                                                                                        | 0.615                              | 59.80                                                   | 32.409                                                         | 54.2                                                                                    | 17.393                                                | 33.86                                                                     | 0.20                                                        | 0.619                                  | 4.64E-05                                          | 1.07                                                                                             |                                                                                                       |
|                              | 1189                                                                     | 39.00                                                                   | 10.19                                                                                                                       | 0.606                              | 67.62                                                   | 37.993                                                         | 56.2                                                                                    | 17.298                                                | 37.27                                                                     | 0.17                                                        | 0.610                                  | 3.78E-05                                          | 1.07                                                                                             |                                                                                                       |
|                              | 1259                                                                     | 42.63                                                                   | 10.68                                                                                                                       | 0.597                              | 75.70                                                   | 43.717                                                         | 57.7                                                                                    | 17.204                                                | 40.81                                                                     | 0.15                                                        | 0.601                                  | 3.24E-05                                          | 1.07                                                                                             |                                                                                                       |
|                              | 1329                                                                     | 46.62                                                                   | 11.18                                                                                                                       | 0.588                              | 84.11                                                   | 49.394                                                         | 58.7                                                                                    | 17.106                                                | 44.62                                                                     | 0.13                                                        | 0.592                                  | 2.93E-05                                          | 1.08                                                                                             |                                                                                                       |
|                              | 1399                                                                     | 51.30                                                                   | 11.68                                                                                                                       | 0.579                              | 92.43                                                   | 54.207                                                         | 58.6                                                                                    | 17.011                                                | 48.96                                                                     | 0.12                                                        | 0.584                                  | 2.54E-05                                          | 1.07                                                                                             |                                                                                                       |
| UE                           | 1463                                                                     | 56.88                                                                   | 12.16                                                                                                                       | 0.570                              | 98.84                                                   | 55.701                                                         | 56.4                                                                                    | 16.918                                                | 54.09                                                                     |                                                             | 0.575                                  |                                                   | 0.94                                                                                             |                                                                                                       |
|                              | 1464                                                                     | 56.68                                                                   | 12.17                                                                                                                       | 0.570                              | 98.56                                                   | 55.574                                                         | 56.4                                                                                    | 16.917                                                | 56.78                                                                     |                                                             | 0.570                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 1595                                                                     | 49.10                                                                   | 12.21                                                                                                                       | 0.569                              | 68.28                                                   | 26.645                                                         | 39.0                                                                                    | 16.907                                                | 52.89                                                                     |                                                             | 0.570                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 1725                                                                     | 42.59                                                                   | 12.02                                                                                                                       | 0.573                              | 49.94                                                   | 10.607                                                         | 21.2                                                                                    | 16.945                                                | 45.84                                                                     |                                                             | 0.571                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 1855                                                                     | 34.95                                                                   | 11.71                                                                                                                       | 0.579                              | 37.14                                                   | 3.247                                                          | 8.7                                                                                     | 17.005                                                | 38.77                                                                     |                                                             | 0.576                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 1985                                                                     | 27.92                                                                   | 11.32                                                                                                                       | 0.585                              | 27.40                                                   | -0.790                                                         | -2.9                                                                                    | 17.080                                                | 31.43                                                                     |                                                             | 0.582                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 2115                                                                     | 22.12                                                                   | 10.88                                                                                                                       | 0.593                              | 19.94                                                   | -3.357                                                         | -16.8                                                                                   | 17.165                                                | 25.02                                                                     |                                                             | 0.589                                  |                                                   |                                                                                                  |                                                                                                       |
| US                           | 2245                                                                     | 17.45                                                                   | 10.39                                                                                                                       | 0.602                              | 14.27                                                   | -5.027                                                         | -35.2                                                                                   | 17.258                                                | 19.79                                                                     |                                                             | 0.598                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 2375                                                                     | 13.62                                                                   | 9.88                                                                                                                        | 0.611                              | 9.84                                                    | -6.182                                                         | -62.8                                                                                   | 17.358                                                | 15.54                                                                     |                                                             | 0.607                                  |                                                   | 0.97                                                                                             |                                                                                                       |
|                              | 2505                                                                     | 10.97                                                                   | 9.36                                                                                                                        | 0.620                              | 6.90                                                    | -6.941                                                         | -100.6                                                                                  | 17.457                                                | 12.30                                                                     | 0.38                                                        | 0.616                                  | 9.00E-05                                          | 1.23                                                                                             |                                                                                                       |
|                              | 2635                                                                     | 8.27                                                                    | 8.86                                                                                                                        | 0.630                              | 4.18                                                    | -7.459                                                         | -178.4                                                                                  | 17.554                                                | 9.62                                                                      | 0.37                                                        | 0.625                                  | 8.02E-05                                          | 1.80                                                                                             |                                                                                                       |
| UE                           | 2765                                                                     | 6.02                                                                    | 8.29                                                                                                                        | 0.640                              | 2.17                                                    | -7.851                                                         | -361.4                                                                                  | 17.663                                                | 7.15                                                                      | 0.33                                                        | 0.635                                  | 8.22E-05                                          | 2.14                                                                                             |                                                                                                       |
|                              | 2783                                                                     | 5.68                                                                    | 8.21                                                                                                                        | 0.641                              | 1.91                                                    | -7.895                                                         | -414.0                                                                                  | 17.678                                                | 5.85                                                                      |                                                             | 0.640                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 2785                                                                     | 5.95                                                                    | 8.21                                                                                                                        | 0.641                              | 2.10                                                    | -7.901                                                         | -375.7                                                                                  | 17.679                                                | 5.81                                                                      |                                                             | 0.641                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 2845                                                                     | 14.31                                                                   | 8.48                                                                                                                        | 0.636                              | 9.73                                                    | -7.622                                                         | -78.4                                                                                   | 17.628                                                | 10.13                                                                     |                                                             | 0.639                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 2905                                                                     | 20.69                                                                   | 8.89                                                                                                                        | 0.629                              | 16.35                                                   | -6.932                                                         | -42.4                                                                                   | 17.548                                                | 17.50                                                                     |                                                             | 0.633                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 2965                                                                     | 26.09                                                                   | 9.33                                                                                                                        | 0.621                              | 22.37                                                   | -5.809                                                         | -26.0                                                                                   | 17.464                                                | 23.39                                                                     |                                                             | 0.625                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 3025                                                                     | 30.96                                                                   | 9.77                                                                                                                        | 0.613                              | 28.33                                                   | -4.022                                                         | -14.2                                                                                   | 17.378                                                | 28.53                                                                     |                                                             | 0.617                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 3085                                                                     | 35.49                                                                   | 10.22                                                                                                                       | 0.605                              | 34.75                                                   | -1.116                                                         | -3.2                                                                                    | 17.293                                                | 33.22                                                                     |                                                             | 0.609                                  |                                                   |                                                                                                  |                                                                                                       |
| US                           | 3145                                                                     | 39.37                                                                   | 10.63                                                                                                                       | 0.598                              | 41.85                                                   | 3.652                                                          | 8.7                                                                                     | 17.212                                                | 37.43                                                                     |                                                             | 0.602                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 3205                                                                     | 42.47                                                                   | 11.02                                                                                                                       | 0.591                              | 49.93                                                   | 10.755                                                         | 21.5                                                                                    | 17.137                                                | 40.92                                                                     | 1.34                                                        | 0.594                                  | 1.47E-04                                          | 1.03                                                                                             |                                                                                                       |
|                              | 3265                                                                     | 45.19                                                                   | 11.39                                                                                                                       | 0.584                              | 58.90                                                   | 19.310                                                         | 32.8                                                                                    | 17.067                                                | 43.83                                                                     | 0.65                                                        | 0.588                                  | 6.78E-05                                          | 1.02                                                                                             |                                                                                                       |
|                              | 3325                                                                     | 48.49                                                                   | 11.74                                                                                                                       | 0.578                              | 68.66                                                   | 27.910                                                         | 40.6                                                                                    | 16.998                                                | 46.84                                                                     |                                                             | 0.581                                  |                                                   | 1.00                                                                                             |                                                                                                       |

## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-8A - Depth 48.5 - 50.2 ft  
 Boring B-2321UD



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-8A - Depth 48.5 - 50.2 ft  
 Boring B-2321UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-11 File Name: B-2321\_UD8a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas.; ☐ Assumed Ring No.: 4  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.755  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                                          |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                                       | No. Layers =            |
| Sample No.: UD-8                                   | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =                                      | Drop (in.) =            |
| Depth (ft): 48.5 - 50.2                            | Specimen No.: A                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                                       | Initial - Trimming Location |                                                              |             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|--------------------------------------------------------------|-------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)                                                  | Sides (W3)  |                                | Mass Moist Soil + Ring (g)                           | 326.11  | 324.79 |
| Container No.                                            | 959                         | 2006                                                         | 2026        | 59                             | Mass Ring (g)                                        | 210.11  |        |
| Mass Moist Soil + Container (g)                          | 110.19                      | 97.44                                                        | 80.30       | 61.71                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 116.00  | 114.68 |
| Mass Dry Soil + Container (g)                            | 92.94                       | 82.87                                                        | 69.03       | 54.77                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 32.10                       | 30.37                                                        | 30.63       | 30.24                          | Container No.                                        | 2012    |        |
| WATER CONTENT (%)                                        | 28.35                       | 27.75                                                        | 29.35       | 28.29                          | Mass Dry Soil + Container (g)                        | 30.78   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 28.48                       | Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ; | Whole Spec. |                                | Mass Container (g)                                   | 30.55   |        |
| See attached data sheet(s) for additional water contents |                             |                                                              |             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.23    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                                                       |                                                                       |                                                                       | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                                                       | Final                                                                 |                                                                       | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 19.050 |
| with Spec.                                                                                                                                                                   | without Spec.                                                         | with Spec.                                                            | without Spec.                                                         | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 19.230                                                                                                                                                                       | 0.000                                                                 | 12.140                                                                | 13.040                                                                | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 19.260  | 12.118 |
| 19.220                                                                                                                                                                       | 0.000                                                                 | 12.070                                                                | 12.960                                                                | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 12.976 |
| 19.240                                                                                                                                                                       | 0.000                                                                 | 12.050                                                                | 12.960                                                                | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 19.260  | 18.192 |
| 19.310                                                                                                                                                                       | 0.000                                                                 | 12.170                                                                | 12.940                                                                | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 19.300                                                                                                                                                                       | 0.000                                                                 | 12.160                                                                | 12.980                                                                | Initial Height, $H_o$                                   |                                                                     | 19.260  |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ | 1.216   |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           | 18.044  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                                                       |                                                                       |                                                                       |                                                         | Final Soil Height Measurement, $H_{f,m}$                            | 18.192  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                                                       |                                                                       |                                                                       |                                                         | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               | -0.77   |        |

| Estimated Initial Unit Weight                                                                         |                                   | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 118.41                                                                  | Dry, $\gamma_{d,o}$ (pcf) = 92.16 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |                                   | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |                                   | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |                                   | Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Light Yellowish Brown and Light Gray Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/4/2008 Date: 4/5/2008 Final Calc. By: DH Date: 4/14/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-11 File Name: B-2321\_UD8a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 28.35                    | 90.38                    | 92.1                         | 99.5                  | 101.4 |
| 2                | " Bottom, W2          | 27.75                    | 90.80                    | 91.1                         | 98.3                  | 100.3 |
| 3                | " Sides, W3           | 29.35                    | 89.68                    | 93.7                         | 101.2                 | 103.2 |
| 4                | " Average, W4         | 28.48                    | 90.28                    | 92.3                         | 99.7                  | 101.6 |
| 5                | " Back Calculated (1) | 29.44                    | 89.62 (3)                | 93.9                         | 101.4                 | 103.4 |
| 6                | Final                 | 28.29                    | 89.62 (2)                | 93.9                         | 101.4                 | 103.4 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.749</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.734</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11599 |
| Final Selected, $K_f$                                                           | 0.11599 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>90.16</u>                                                                 |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>89.89</u>                                          |  |                              |

| Summary of Specimen Physical Properties    |                            |                  |                                   |                                               |                                             |                                                                                          |                                                                              |                                                     |  |
|--------------------------------------------|----------------------------|------------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------|--|
| Specific Gravity<br>G <sub>s</sub> = 2.720 |                            |                  |                                   | Assumed                                       |                                             | To make S <sub>f</sub> = 100% at end of test.                                            |                                                                              |                                                     |  |
|                                            |                            |                  | X                                 | Measured                                      |                                             | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                                              |                                                     |  |
| Mass Dry<br>Soil, (g)                      | Initial: 89.62             |                  | X                                 | From Cal. Routine No.                         |                                             | 5                                                                                        | Note: Routine #5 is based on final measurements.                             |                                                     |  |
|                                            | Final (4): NA              |                  |                                   | Make S <sub>f</sub> = 100%, or;               |                                             |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%                                |                                                     |  |
| Initial Height (mm) = 19.26                |                            |                  |                                   | X                                             | Measured ;                                  |                                                                                          |                                                                              | Back Calculated Back-cal. Sat. (%) = NA             |  |
| Final Height (mm) = 18.19                  |                            |                  |                                   | X                                             | Measured ;                                  |                                                                                          |                                                                              | Initial H <sub>0</sub> & dial change during loading |  |
|                                            | Water<br>Content, w<br>(%) | Void Ratio,<br>e | Degree of<br>Saturation, S<br>(%) | Total Unit<br>Weight, γ <sub>t</sub><br>(pcf) | Dry Unit<br>Weight, γ <sub>d</sub><br>(pcf) | Height of<br>Solids, H <sub>s</sub> (2,4)<br>(mm)                                        | Extruded soil loss proportioned in<br>increasing loading increments (5)<br>: |                                                     |  |
| Initial                                    | 29.4                       | 0.853            | 93.9                              | 118.4                                         | 91.5                                        | 10.395                                                                                   | From                                                                         | To (ksf)                                            |  |
| Final                                      | 28.0                       | 0.750            | 101.4                             | 123.9                                         | 96.8                                        | NA                                                                                       | NA                                                                           | NA                                                  |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 64 | Minus 200 (%) |
| Casagrande Method      | 23.30             | NA                                | 0.165 | 0.055 | 3.7 | Plastic Limit (PL)    | 16 | 97.0          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 48 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP

Date: 4/15/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-11 File Name: B-2321\_UD8a  
 Task No.: NA Date; Start: 4/5/2008 Initial Height,  $H_o$  (mm): 19.26  
 Project Name: Exelon (Victoria) Completed: 4/14/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7546  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b,BE}$  (psi): 70.59512,  $V$ : 0.023204764 Piston Uplift,  $P_{up}$  (lbf): 34.69  
 Back Pressure,  $U_{b,CS}$  (psi): 70.61285,  $V$ : 0.023210605 Setup  $DT_{ref}$  (V): 0.001116795  
 Displacement Transducer No.: DT-099 Calib. Factor (mm/V): 387.222306 Ch. No.: 2  
 Pore Press. Transducer No.: PT-122 Calib. Factor (psi/V): 3035.3833 Ref. Zero (V): -0.000053 Ch. No.: 3  
 Force Cell No.: FT-410 Calib. Factor (lbf/V): -160210.65 Ref. Zero (V): -0.000043 Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 96                    | 11 : 12 : 29         |                                                                    | 0.09                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 96                    | 11 : 45 : 38         |                                                                    | 0.53                                                        |                                                            | 0.040                                                         | 0.000                                                                 | 0.040                                                                   |                                                                              |
| BE                           | 97                    | 15 : 53 : 14         |                                                                    | 0.41                                                        | -0.003                                                     | -0.219                                                        | 0.000                                                                 | -0.219                                                                  |                                                                              |
| CS                           | 97                    | 15 : 53 : 17         | 0                                                                  | 0.41                                                        | 0.000                                                      | -0.219                                                        | 0.000                                                                 | -0.219                                                                  |                                                                              |
|                              | 97                    | 17 : 30 : 49         | 98                                                                 | 1.22                                                        | 0.050                                                      | -0.090                                                        | 0.000                                                                 | -0.090                                                                  | 0.409                                                                        |
|                              | 97                    | 19 : 08 : 21         | 195                                                                | 1.87                                                        | 0.082                                                      | 0.034                                                         | 0.000                                                                 | 0.034                                                                   | 0.396                                                                        |
| US                           | 97                    | 20 : 45 : 52         | 293                                                                | 2.76                                                        | 0.186                                                      | 0.146                                                         | 0.000                                                                 | 0.146                                                                   | 0.359                                                                        |
|                              | 97                    | 22 : 23 : 24         | 390                                                                | 3.97                                                        | 0.511                                                      | 0.255                                                         | 0.000                                                                 | 0.255                                                                   | 0.347                                                                        |
|                              | 98                    | 00 : 00 : 55         | 488                                                                | 5.61                                                        | 1.099                                                      | 0.363                                                         | 0.000                                                                 | 0.363                                                                   | 0.347                                                                        |
|                              | 98                    | 01 : 38 : 27         | 585                                                                | 7.61                                                        | 1.961                                                      | 0.464                                                         | 0.000                                                                 | 0.464                                                                   | 0.323                                                                        |
|                              | 98                    | 03 : 15 : 58         | 683                                                                | 10.00                                                       | 3.163                                                      | 0.580                                                         | 0.000                                                                 | 0.580                                                                   | 0.369                                                                        |
|                              | 98                    | 04 : 53 : 29         | 780                                                                | 12.78                                                       | 4.409                                                      | 0.694                                                         | 0.000                                                                 | 0.694                                                                   | 0.363                                                                        |
|                              | 98                    | 06 : 31 : 00         | 878                                                                | 15.44                                                       | 5.396                                                      | 0.802                                                         | 0.000                                                                 | 0.802                                                                   | 0.345                                                                        |
|                              | 98                    | 08 : 08 : 32         | 975                                                                | 18.68                                                       | 6.835                                                      | 0.905                                                         | 0.000                                                                 | 0.905                                                                   | 0.331                                                                        |
|                              | 98                    | 09 : 46 : 04         | 1073                                                               | 22.39                                                       | 8.573                                                      | 1.013                                                         | 0.000                                                                 | 1.013                                                                   | 0.346                                                                        |
|                              | 98                    | 11 : 23 : 36         | 1170                                                               | 26.30                                                       | 10.299                                                     | 1.124                                                         | 0.000                                                                 | 1.124                                                                   | 0.355                                                                        |
|                              | 98                    | 13 : 01 : 07         | 1268                                                               | 30.46                                                       | 12.176                                                     | 1.227                                                         | 0.000                                                                 | 1.227                                                                   | 0.327                                                                        |
|                              | 98                    | 14 : 38 : 38         | 1365                                                               | 34.90                                                       | 14.293                                                     | 1.327                                                         | 0.000                                                                 | 1.327                                                                   | 0.319                                                                        |
|                              | 98                    | 16 : 16 : 09         | 1463                                                               | 39.58                                                       | 16.573                                                     | 1.431                                                         | 0.000                                                                 | 1.431                                                                   | 0.332                                                                        |
|                              | 98                    | 17 : 53 : 40         | 1560                                                               | 44.53                                                       | 19.089                                                     | 1.532                                                         | 0.000                                                                 | 1.532                                                                   | 0.324                                                                        |
|                              | 98                    | 19 : 31 : 12         | 1658                                                               | 49.61                                                       | 21.693                                                     | 1.634                                                         | 0.000                                                                 | 1.634                                                                   | 0.326                                                                        |
|                              | 98                    | 21 : 08 : 44         | 1755                                                               | 54.91                                                       | 24.361                                                     | 1.738                                                         | 0.000                                                                 | 1.738                                                                   | 0.333                                                                        |
|                              | 98                    | 22 : 46 : 15         | 1853                                                               | 60.34                                                       | 27.095                                                     | 1.840                                                         | 0.000                                                                 | 1.840                                                                   | 0.326                                                                        |
| UE                           | 99                    | 00 : 09 : 01         | 1936                                                               | 65.16                                                       | 29.488                                                     | 1.926                                                         | 0.000                                                                 | 1.926                                                                   | 0.324                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 99                    | 00 : 16 : 17         | 1943                                                               | 63.01                                                       | 27.459                                                     | 1.927                                                         | 0.000                                                                 | 1.927                                                                   | 0.032                                                                        |
|                              | 99                    | 03 : 23 : 49         | 2131                                                               | 38.21                                                       | 0.436                                                      | 1.908                                                         | 0.000                                                                 | 1.908                                                                   | -0.032                                                                       |
|                              | 99                    | 06 : 31 : 22         | 2318                                                               | 26.81                                                       | -6.935                                                     | 1.837                                                         | 0.000                                                                 | 1.837                                                                   | -0.118                                                                       |
|                              | 99                    | 09 : 38 : 55         | 2506                                                               | 21.65                                                       | -7.222                                                     | 1.765                                                         | 0.000                                                                 | 1.765                                                                   | -0.120                                                                       |
|                              | 99                    | 12 : 46 : 28         | 2693                                                               | 15.40                                                       | -9.375                                                     | 1.678                                                         | 0.000                                                                 | 1.678                                                                   | -0.145                                                                       |
| US                           | 99                    | 15 : 54 : 03         | 2881                                                               | 11.14                                                       | -9.782                                                     | 1.581                                                         | 0.000                                                                 | 1.581                                                                   | -0.161                                                                       |
|                              | 99                    | 19 : 01 : 36         | 3068                                                               | 8.02                                                        | -9.617                                                     | 1.481                                                         | 0.000                                                                 | 1.481                                                                   | -0.166                                                                       |
|                              | 99                    | 22 : 09 : 11         | 3256                                                               | 5.77                                                        | -9.194                                                     | 1.381                                                         | 0.000                                                                 | 1.381                                                                   | -0.166                                                                       |
|                              | 100                   | 01 : 16 : 45         | 3443                                                               | 3.94                                                        | -8.590                                                     | 1.279                                                         | 0.000                                                                 | 1.279                                                                   | -0.168                                                                       |
|                              | 100                   | 04 : 24 : 18         | 3631                                                               | 2.35                                                        | -8.234                                                     | 1.188                                                         | 0.000                                                                 | 1.188                                                                   | -0.152                                                                       |
| UE                           | 100                   | 07 : 31 : 52         | 3819                                                               | 1.12                                                        | -7.674                                                     | 1.075                                                         | 0.000                                                                 | 1.075                                                                   | -0.187                                                                       |
|                              | 100                   | 07 : 35 : 03         | 3822                                                               | 1.11                                                        | -7.657                                                     | 1.073                                                         | 0.000                                                                 | 1.073                                                                   | -0.225                                                                       |
|                              | 100                   | 07 : 39 : 22         | 3826                                                               | 1.30                                                        | -7.572                                                     | 1.072                                                         | 0.000                                                                 | 1.072                                                                   | -0.045                                                                       |
|                              | 100                   | 09 : 01 : 53         | 3909                                                               | 6.42                                                        | -2.469                                                     | 1.111                                                         | 0.000                                                                 | 1.111                                                                   | 0.146                                                                        |
|                              | 100                   | 10 : 24 : 25         | 3991                                                               | 12.33                                                       | 3.549                                                      | 1.184                                                         | 0.000                                                                 | 1.184                                                                   | 0.278                                                                        |
| US                           | 100                   | 11 : 46 : 58         | 4074                                                               | 17.78                                                       | 8.120                                                      | 1.249                                                         | 0.000                                                                 | 1.249                                                                   | 0.245                                                                        |
|                              | 100                   | 13 : 09 : 29         | 4156                                                               | 23.18                                                       | 12.120                                                     | 1.326                                                         | 0.000                                                                 | 1.326                                                                   | 0.288                                                                        |
|                              | 100                   | 14 : 32 : 01         | 4239                                                               | 28.81                                                       | 15.760                                                     | 1.408                                                         | 0.000                                                                 | 1.408                                                                   | 0.309                                                                        |
|                              | 100                   | 15 : 54 : 33         | 4321                                                               | 34.23                                                       | 18.998                                                     | 1.493                                                         | 0.000                                                                 | 1.493                                                                   | 0.322                                                                        |
|                              | 100                   | 17 : 17 : 04         | 4404                                                               | 39.57                                                       | 21.867                                                     | 1.576                                                         | 0.000                                                                 | 1.576                                                                   | 0.314                                                                        |
|                              | 100                   | 18 : 39 : 37         | 4486                                                               | 44.95                                                       | 24.531                                                     | 1.659                                                         | 0.000                                                                 | 1.659                                                                   | 0.312                                                                        |
|                              | 100                   | 20 : 02 : 09         | 4569                                                               | 50.41                                                       | 26.995                                                     | 1.745                                                         | 0.000                                                                 | 1.745                                                                   | 0.327                                                                        |
|                              | 100                   | 21 : 24 : 41         | 4651                                                               | 56.07                                                       | 29.374                                                     | 1.828                                                         | 0.000                                                                 | 1.828                                                                   | 0.314                                                                        |
|                              | 100                   | 22 : 47 : 13         | 4734                                                               | 61.70                                                       | 31.512                                                     | 1.911                                                         | 0.000                                                                 | 1.911                                                                   | 0.312                                                                        |
|                              | 101                   | 00 : 09 : 44         | 4816                                                               | 67.31                                                       | 33.514                                                     | 1.991                                                         | 0.000                                                                 | 1.991                                                                   | 0.303                                                                        |
|                              | 101                   | 01 : 32 : 16         | 4899                                                               | 73.09                                                       | 35.731                                                     | 2.077                                                         | 0.000                                                                 | 2.077                                                                   | 0.325                                                                        |
|                              | 101                   | 02 : 54 : 48         | 4982                                                               | 78.86                                                       | 38.173                                                     | 2.162                                                         | 0.000                                                                 | 2.162                                                                   | 0.320                                                                        |
|                              | 101                   | 04 : 17 : 20         | 5064                                                               | 84.82                                                       | 41.050                                                     | 2.247                                                         | 0.000                                                                 | 2.247                                                                   | 0.321                                                                        |
|                              | 101                   | 05 : 39 : 52         | 5147                                                               | 90.51                                                       | 43.764                                                     | 2.330                                                         | 0.000                                                                 | 2.330                                                                   | 0.310                                                                        |
|                              | 101                   | 07 : 02 : 23         | 5229                                                               | 96.34                                                       | 46.560                                                     | 2.412                                                         | 0.000                                                                 | 2.412                                                                   | 0.310                                                                        |
|                              | 101                   | 08 : 24 : 56         | 5312                                                               | 102.25                                                      | 49.291                                                     | 2.493                                                         | 0.000                                                                 | 2.493                                                                   | 0.308                                                                        |
| UE                           | 101                   | 09 : 47 : 29         | 5394                                                               | 108.29                                                      | 52.005                                                     | 2.577                                                         | 0.000                                                                 | 2.577                                                                   | 0.316                                                                        |
|                              | 101                   | 10 : 58 : 43         | 5465                                                               | 113.63                                                      | 54.437                                                     | 2.649                                                         | 0.000                                                                 | 2.649                                                                   | 0.314                                                                        |
|                              | 101                   | 11 : 02 : 30         | 5469                                                               | 112.37                                                      | 53.521                                                     | 2.647                                                         | 0.000                                                                 | 2.647                                                                   | -0.119                                                                       |
|                              | 101                   | 16 : 10 : 08         | 5777                                                               | 65.77                                                       | 1.660                                                      | 2.626                                                         | 0.000                                                                 | 2.626                                                                   | -0.022                                                                       |
|                              | 101                   | 21 : 17 : 46         | 6084                                                               | 43.49                                                       | -10.698                                                    | 2.520                                                         | 0.000                                                                 | 2.520                                                                   | -0.107                                                                       |
|                              | 102                   | 02 : 25 : 23         | 6392                                                               | 30.65                                                       | -10.647                                                    | 2.377                                                         | 0.000                                                                 | 2.377                                                                   | -0.145                                                                       |
| US                           | 102                   | 07 : 33 : 00         | 6700                                                               | 21.45                                                       | -10.675                                                    | 2.223                                                         | 0.000                                                                 | 2.223                                                                   | -0.155                                                                       |
|                              | 102                   | 12 : 40 : 37         | 7007                                                               | 15.94                                                       | -10.548                                                    | 2.080                                                         | 0.000                                                                 | 2.080                                                                   | -0.145                                                                       |
|                              | 102                   | 17 : 48 : 13         | 7315                                                               | 10.79                                                       | -10.468                                                    | 1.919                                                         | 0.000                                                                 | 1.919                                                                   | -0.163                                                                       |
|                              | 102                   | 22 : 55 : 51         | 7623                                                               | 6.78                                                        | -10.424                                                    | 1.754                                                         | 0.000                                                                 | 1.754                                                                   | -0.168                                                                       |
|                              | 103                   | 04 : 03 : 29         | 7930                                                               | 3.93                                                        | -10.326                                                    | 1.580                                                         | 0.000                                                                 | 1.580                                                                   | -0.176                                                                       |



## CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-11 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD8  
 Task No.: NA Date, Start: 4/5/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.6 Piston Uplift,  $P_{up}$  (lbf): 34.69  
 Project Name: Exelon (Victoria) Completed: 4/14/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$   
 4186-06-Summary of Methods: NA ☐ Data corrected for salt ; in ☐ g/kg  
 Final Description of Specimen: Mottled Light Yellowish Brown and Light Gray Fat CLAY (CH) 0  
 Ring No.: 4 Area,  $A_r$  (cm<sup>2</sup>): 31.755 Solids Ht.,  $H_s$  (mm): 10.395 Specific Gravity,  $G_s = 2.720$  ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.26 Water 29.4 Void 0.853 Deg. of 93.9 Total Unit 118.4 Dry Unit 91.5  
**Final:** (mm):  $H_f$ : 18.19 Content,  $w$  (%): 28.0 Ratio,  $e$ : 0.750 Sat.,  $S$  (%): 101.4 Weight,  $\gamma_t$  (pcf): 123.9 Weight,  $\gamma_d$  (pcf): 96.8

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP HP

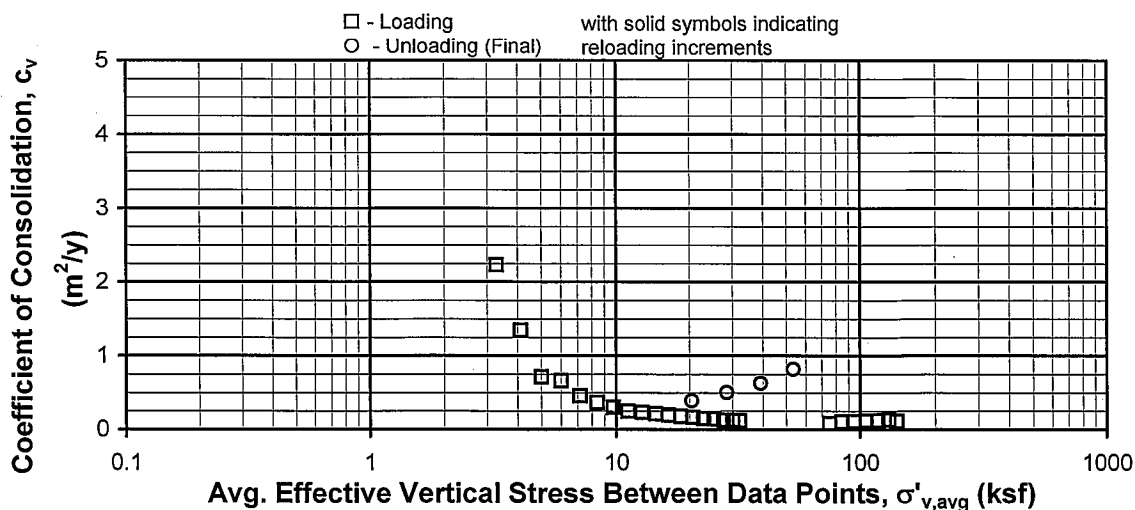
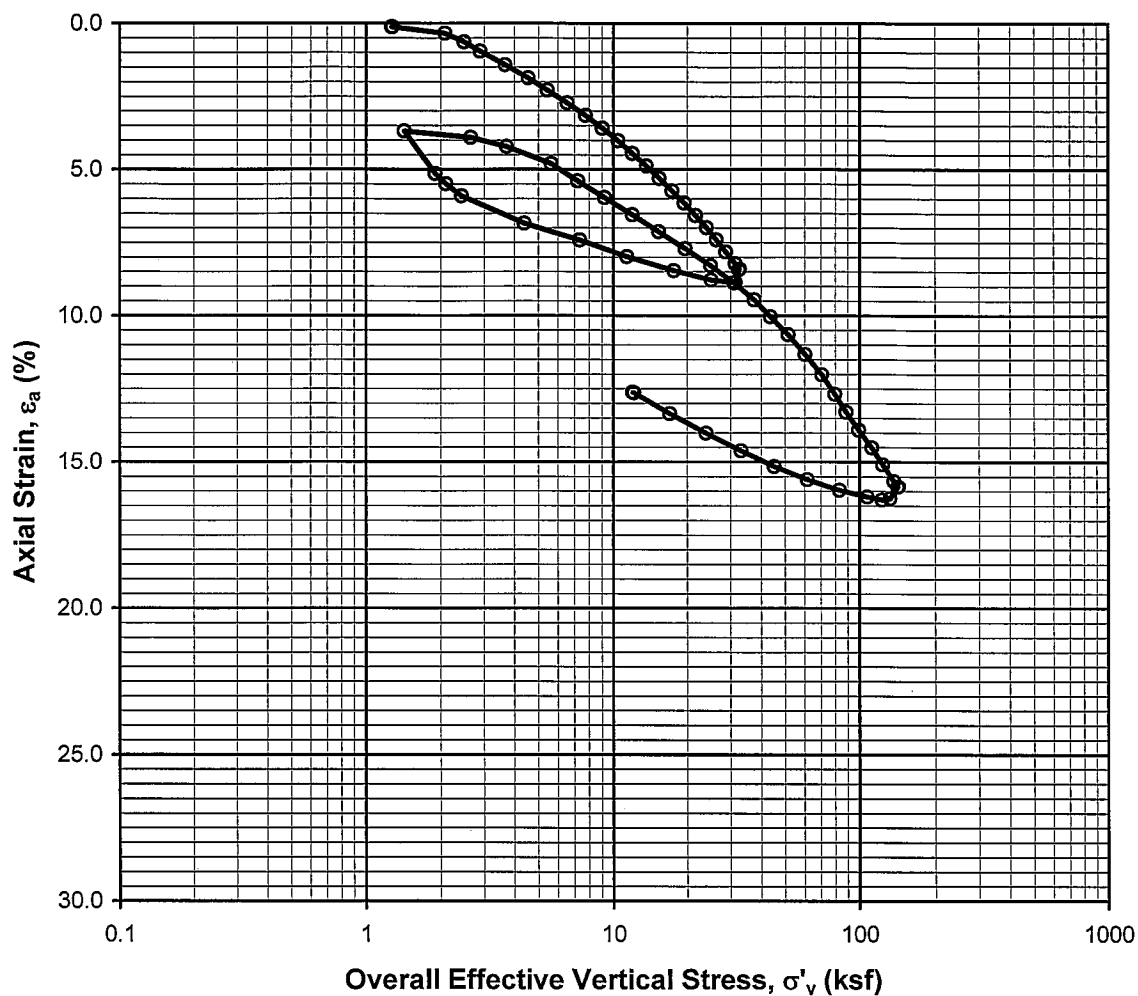
| Loading Info.<br>(1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                             |                                                         |                               |                                          | Steady State Ratio, $SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $c_\alpha = \Delta d_{a,sc} / H_o$ ( $\times 10^{-4}$ ) |
|----------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                      |                                                        |                                                          |                                                                                                        |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf) | Coefficient of Consolidation, $c_v$ (m <sup>2</sup> /y) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                      |
| S                    |                                                        |                                                          |                                                                                                        |                           | 0.09                                        |                                                    |                                                                          |                                           | Data on given line represents average conditions           |                                                         |                               |                                          |                                                                                       |                                                                                      |
| BS                   |                                                        |                                                          | 0.21                                                                                                   | 0.849                     | 0.53                                        |                                                    |                                                                          | 19.220                                    | between that line and the previous line of data.           |                                                         |                               |                                          |                                                                                       |                                                                                      |
| BE                   |                                                        | 0.41                                                     | -1.14                                                                                                  | 0.874                     | 0.41                                        | -0.003                                             | -0.6                                                                     | 19.479                                    |                                                            |                                                         | 0.862                         |                                          |                                                                                       |                                                                                      |
| CS                   | 0                                                      | 0.41                                                     | -1.14                                                                                                  | 0.874                     | 0.41                                        | 0.000                                              | 0.0                                                                      | 19.479                                    |                                                            |                                                         | 0.874                         |                                          |                                                                                       |                                                                                      |
|                      | 98                                                     | 1.19                                                     | -0.47                                                                                                  | 0.862                     | 1.22                                        | 0.050                                              | 4.1                                                                      | 19.350                                    | 0.80                                                       |                                                         | 0.868                         |                                          |                                                                                       |                                                                                      |
|                      | 195                                                    | 1.82                                                     | 0.17                                                                                                   | 0.850                     | 1.87                                        | 0.082                                              | 4.4                                                                      | 19.226                                    | 1.50                                                       |                                                         | 0.856                         |                                          |                                                                                       |                                                                                      |
| US                   | 293                                                    | 2.63                                                     | 0.76                                                                                                   | 0.839                     | 2.76                                        | 0.186                                              | 6.8                                                                      | 19.114                                    | 2.22                                                       |                                                         | 0.844                         |                                          |                                                                                       |                                                                                      |
|                      | 390                                                    | 3.62                                                     | 1.32                                                                                                   | 0.828                     | 3.97                                        | 0.511                                              | 12.9                                                                     | 19.005                                    | 3.12                                                       | 3.25                                                    | 0.834                         | 3.29E-03                                 | 3.32                                                                                  |                                                                                      |
|                      | 488                                                    | 4.85                                                     | 1.89                                                                                                   | 0.818                     | 5.61                                        | 1.099                                              | 19.6                                                                     | 18.897                                    | 4.24                                                       | 1.83                                                    | 0.823                         | 1.43E-03                                 | 3.77                                                                                  |                                                                                      |
|                      | 585                                                    | 6.24                                                     | 2.41                                                                                                   | 0.808                     | 7.61                                        | 1.961                                              | 25.8                                                                     | 18.796                                    | 5.55                                                       | 1.11                                                    | 0.813                         | 7.03E-04                                 | 3.47                                                                                  |                                                                                      |
|                      | 683                                                    | 7.76                                                     | 3.01                                                                                                   | 0.797                     | 10.00                                       | 3.163                                              | 31.6                                                                     | 18.680                                    | 7.00                                                       | 0.75                                                    | 0.803                         | 4.81E-04                                 | 3.18                                                                                  |                                                                                      |
|                      | 780                                                    | 9.64                                                     | 3.60                                                                                                   | 0.786                     | 12.78                                       | 4.409                                              | 34.5                                                                     | 18.566                                    | 8.70                                                       | 0.57                                                    | 0.792                         | 3.21E-04                                 | 3.03                                                                                  |                                                                                      |
|                      | 878                                                    | 11.60                                                    | 4.16                                                                                                   | 0.776                     | 15.44                                       | 5.396                                              | 34.9                                                                     | 18.458                                    | 10.62                                                      | 0.41                                                    | 0.781                         | 2.33E-04                                 | 2.66                                                                                  |                                                                                      |
|                      | 975                                                    | 13.79                                                    | 4.70                                                                                                   | 0.766                     | 18.68                                       | 6.835                                              | 36.6                                                                     | 18.355                                    | 12.69                                                      | 0.39                                                    | 0.771                         | 1.78E-04                                 | 3.00                                                                                  |                                                                                      |
|                      | 1073                                                   | 16.23                                                    | 5.26                                                                                                   | 0.755                     | 22.39                                       | 8.573                                              | 38.3                                                                     | 18.247                                    | 15.01                                                      | 0.35                                                    | 0.761                         | 1.47E-04                                 | 3.09                                                                                  |                                                                                      |
|                      | 1170                                                   | 18.89                                                    | 5.84                                                                                                   | 0.745                     | 26.30                                       | 10.299                                             | 39.2                                                                     | 18.136                                    | 17.56                                                      | 0.29                                                    | 0.750                         | 1.22E-04                                 | 2.95                                                                                  |                                                                                      |
|                      | 1268                                                   | 21.67                                                    | 6.37                                                                                                   | 0.735                     | 30.46                                       | 12.176                                             | 40.0                                                                     | 18.033                                    | 20.28                                                      | 0.26                                                    | 0.740                         | 9.36E-05                                 | 2.91                                                                                  |                                                                                      |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

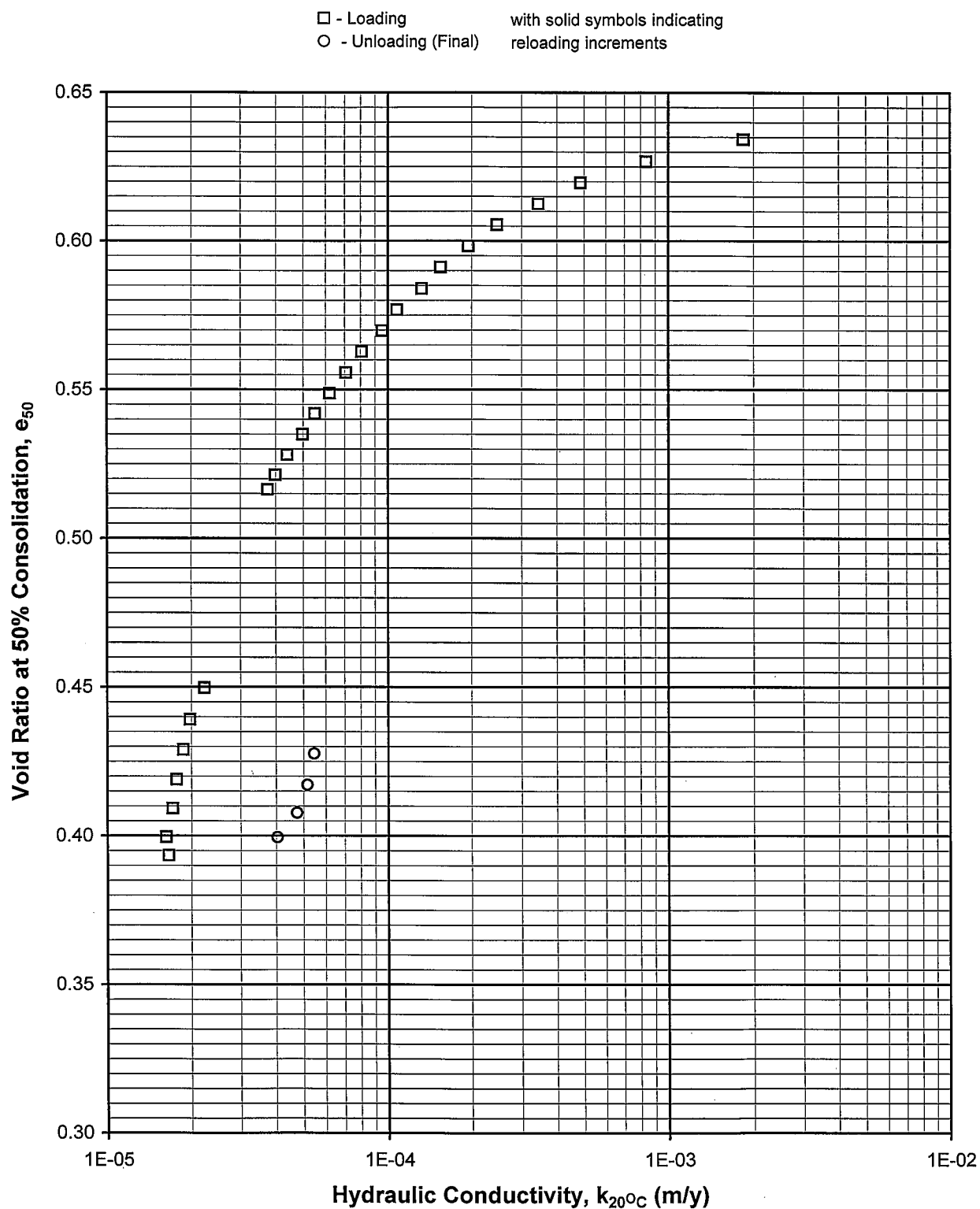
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 1365                                                                     | 24.57                                                                   | 6.89                                                                                                                        | 0.725                              | 34.90                                                   | 14.293                                                         | 40.9                                                                                    | 17.933                                                | 23.12                                                                     | 0.23                                                                | 0.730                                  | 7.70E-05                                          | 2.89                                                                                           |                                                                                                        |
|                              | 1463                                                                     | 27.56                                                                   | 7.43                                                                                                                        | 0.715                              | 39.58                                                   | 16.573                                                         | 41.9                                                                                    | 17.829                                                | 26.07                                                                     | 0.20                                                                | 0.720                                  | 6.80E-05                                          | 2.82                                                                                           |                                                                                                        |
|                              | 1560                                                                     | 30.66                                                                   | 7.95                                                                                                                        | 0.706                              | 44.53                                                   | 19.089                                                         | 42.9                                                                                    | 17.728                                                | 29.11                                                                     | 0.18                                                                | 0.710                                  | 5.70E-05                                          | 2.78                                                                                           |                                                                                                        |
|                              | 1658                                                                     | 33.82                                                                   | 8.48                                                                                                                        | 0.696                              | 49.61                                                   | 21.693                                                         | 43.7                                                                                    | 17.626                                                | 32.24                                                                     | 0.16                                                                | 0.701                                  | 4.98E-05                                          | 2.66                                                                                           |                                                                                                        |
|                              | 1755                                                                     | 37.14                                                                   | 9.02                                                                                                                        | 0.686                              | 54.91                                                   | 24.361                                                         | 44.4                                                                                    | 17.522                                                | 35.48                                                                     | 0.15                                                                | 0.691                                  | 4.46E-05                                          | 2.62                                                                                           |                                                                                                        |
|                              | 1853                                                                     | 40.56                                                                   | 9.55                                                                                                                        | 0.676                              | 60.34                                                   | 27.095                                                         | 44.9                                                                                    | 17.420                                                | 38.85                                                                     | 0.13                                                                | 0.681                                  | 3.87E-05                                          | 2.56                                                                                           |                                                                                                        |
| UE                           | 1936                                                                     | 43.61                                                                   | 10.00                                                                                                                       | 0.668                              | 65.16                                                   | 29.488                                                         | 45.3                                                                                    | 17.334                                                | 42.08                                                                     | 0.12                                                                | 0.672                                  | 3.46E-05                                          | 2.55                                                                                           |                                                                                                        |
|                              | 1943                                                                     | 43.02                                                                   | 10.00                                                                                                                       | 0.668                              | 63.01                                                   | 27.459                                                         | 43.6                                                                                    | 17.333                                                | 43.31                                                                     |                                                                     | 0.668                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2131                                                                     | 37.92                                                                   | 9.91                                                                                                                        | 0.669                              | 38.21                                                   | 0.436                                                          | 1.1                                                                                     | 17.352                                                | 40.47                                                                     |                                                                     | 0.668                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2318                                                                     | 31.26                                                                   | 9.54                                                                                                                        | 0.676                              | 26.81                                                   | -6.935                                                         | -25.9                                                                                   | 17.423                                                | 34.59                                                                     |                                                                     | 0.673                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2506                                                                     | 26.23                                                                   | 9.16                                                                                                                        | 0.683                              | 21.65                                                   | -7.222                                                         | -33.4                                                                                   | 17.495                                                | 28.74                                                                     |                                                                     | 0.680                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2693                                                                     | 21.15                                                                   | 8.71                                                                                                                        | 0.691                              | 15.40                                                   | -9.375                                                         | -60.9                                                                                   | 17.582                                                | 23.69                                                                     |                                                                     | 0.687                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 2881                                                                     | 16.96                                                                   | 8.21                                                                                                                        | 0.701                              | 11.14                                                   | -9.782                                                         | -87.8                                                                                   | 17.679                                                | 19.05                                                                     |                                                                     | 0.696                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3068                                                                     | 13.56                                                                   | 7.69                                                                                                                        | 0.710                              | 8.02                                                    | -9.617                                                         | -120.0                                                                                  | 17.779                                                | 15.26                                                                     |                                                                     | 0.706                                  |                                                   | 0.47                                                                                           |                                                                                                        |
|                              | 3256                                                                     | 10.89                                                                   | 7.17                                                                                                                        | 0.720                              | 5.77                                                    | -9.194                                                         | -159.5                                                                                  | 17.879                                                | 12.22                                                                     |                                                                     | 0.715                                  |                                                   | 0.77                                                                                           |                                                                                                        |
|                              | 3443                                                                     | 8.52                                                                    | 6.64                                                                                                                        | 0.730                              | 3.94                                                    | -8.590                                                         | -218.1                                                                                  | 17.981                                                | 9.70                                                                      | 0.16                                                                | 0.725                                  | 4.78E-05                                          | 1.10                                                                                           |                                                                                                        |
|                              | 3631                                                                     | 6.40                                                                    | 6.17                                                                                                                        | 0.739                              | 2.35                                                    | -8.234                                                         | -351.0                                                                                  | 18.072                                                | 7.46                                                                      | 0.18                                                                | 0.734                                  | 4.56E-05                                          | 1.59                                                                                           |                                                                                                        |
| UE                           | 3819                                                                     | 4.43                                                                    | 5.58                                                                                                                        | 0.749                              | 1.12                                                    | -7.674                                                         | -682.6                                                                                  | 18.185                                                | 5.42                                                                      | 0.20                                                                | 0.744                                  | 5.89E-05                                          | 2.14                                                                                           |                                                                                                        |
|                              | 3822                                                                     | 4.41                                                                    | 5.57                                                                                                                        | 0.750                              | 1.11                                                    | -7.657                                                         | -687.8                                                                                  | 18.187                                                | 4.42                                                                      |                                                                     | 0.750                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3826                                                                     | 4.67                                                                    | 5.57                                                                                                                        | 0.750                              | 1.30                                                    | -7.572                                                         | -583.5                                                                                  | 18.188                                                | 4.54                                                                      |                                                                     | 0.750                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3909                                                                     | 7.97                                                                    | 5.77                                                                                                                        | 0.746                              | 6.42                                                    | -2.469                                                         | -38.5                                                                                   | 18.149                                                | 6.32                                                                      |                                                                     | 0.748                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 3991                                                                     | 9.83                                                                    | 6.15                                                                                                                        | 0.739                              | 12.33                                                   | 3.549                                                          | 28.8                                                                                    | 18.076                                                | 8.90                                                                      |                                                                     | 0.742                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 4074                                                                     | 11.84                                                                   | 6.49                                                                                                                        | 0.733                              | 17.78                                                   | 8.120                                                          | 45.7                                                                                    | 18.011                                                | 10.84                                                                     |                                                                     | 0.736                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 4156                                                                     | 14.15                                                                   | 6.88                                                                                                                        | 0.725                              | 23.18                                                   | 12.120                                                         | 52.3                                                                                    | 17.934                                                | 13.00                                                                     |                                                                     | 0.729                                  |                                                   | 0.39                                                                                           |                                                                                                        |
|                              | 4239                                                                     | 16.99                                                                   | 7.31                                                                                                                        | 0.717                              | 28.81                                                   | 15.760                                                         | 54.7                                                                                    | 17.852                                                | 15.57                                                                     |                                                                     | 0.721                                  |                                                   | 0.57                                                                                           |                                                                                                        |
|                              | 4321                                                                     | 19.96                                                                   | 7.75                                                                                                                        | 0.709                              | 34.23                                                   | 18.998                                                         | 55.5                                                                                    | 17.767                                                | 18.47                                                                     |                                                                     | 0.713                                  |                                                   | 0.65                                                                                           |                                                                                                        |
|                              | 4404                                                                     | 23.15                                                                   | 8.18                                                                                                                        | 0.701                              | 39.57                                                   | 21.867                                                         | 55.3                                                                                    | 17.684                                                | 21.55                                                                     |                                                                     | 0.705                                  |                                                   | 0.72                                                                                           |                                                                                                        |
|                              | 4486                                                                     | 26.57                                                                   | 8.61                                                                                                                        | 0.693                              | 44.95                                                   | 24.531                                                         | 54.6                                                                                    | 17.601                                                | 24.86                                                                     |                                                                     | 0.697                                  |                                                   | 0.80                                                                                           |                                                                                                        |
|                              | 4569                                                                     | 30.24                                                                   | 9.06                                                                                                                        | 0.685                              | 50.41                                                   | 26.995                                                         | 53.5                                                                                    | 17.515                                                | 28.40                                                                     |                                                                     | 0.689                                  |                                                   | 0.88                                                                                           |                                                                                                        |
|                              | 4651                                                                     | 34.19                                                                   | 9.49                                                                                                                        | 0.677                              | 56.07                                                   | 29.374                                                         | 52.4                                                                                    | 17.432                                                | 32.21                                                                     |                                                                     | 0.681                                  |                                                   | 0.99                                                                                           |                                                                                                        |

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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-9A - Depth 58.5 - 61.0 ft  
 Boring B-2321UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-9A - Depth 58.5 - 61.0 ft  
Boring B-2321UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD9a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.680 ☒ Meas. ; ☐ Assumed Ring No.: 3  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.723  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                 |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =              | No. Layers =            |
| Sample No.: UD-9                                   | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =             | Drop (in.) =            |
| Depth (ft): 58.5 - 61.0                            | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                   | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                             |                                                          | Initial - Trimming Location |                                     |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|------------------------------------------------|----------------------------------------------------------|-----------------------------|-------------------------------------|------------|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                                |                                                          | Top (W1)                    | Bottom (W2)                         | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 332.83  | 329.00 |
| Container No.                                  |                                                          | 116                         | 777                                 | 2005       | 893                                   | Mass Ring (g)                                              | 211.72  |        |
| Mass Moist Soil + Container (g)                |                                                          | 123.75                      | 116.33                              | 95.26      | 59.71                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 121.11  | 117.28 |
| Mass Dry Soil + Container (g)                  |                                                          | 108.35                      | 102.68                              | 84.97      | 55.84                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                             |                                                          | 29.70                       | 31.78                               | 30.54      | 32.27                                 | Container No.                                              |         | 2041   |
| WATER CONTENT (%)                              |                                                          | 19.58                       | 19.25                               | 18.91      | 16.42                                 | Mass Dry Soil + Container (g)                              |         | 31.24  |
| Avg. Initial Water Content, W <sub>4</sub> (%) |                                                          | 19.25                       | Final W <sub>at</sub> : X   Slice ; |            | Whole Spec.                           | Mass Container (g)                                         |         | 30.79  |
|                                                | See attached data sheet(s) for additional water contents |                             |                                     |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 0.45   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 12.740 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.240                                                                                                                                                                       | 0.000                                  | 17.150                                    | 13.120                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.218                                                              | 17.138 |
| 19.250                                                                                                                                                                       | 0.000                                  | 17.030                                    | 13.060                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.072 |
| 19.160                                                                                                                                                                       | 0.000                                  | 17.120                                    | 13.070                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.218                                                              | 16.806 |
| 19.180                                                                                                                                                                       | 0.000                                  | 17.260                                    | 13.080                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.260                                                                                                                                                                       | 0.000                                  | 17.130                                    | 13.030                      | Initial Height, $H_o$                                   |  | 19.218                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 16.806                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | -0.06                                                               |        |

| Estimated Initial Unit Weight                                                              |                                    | Soil Extruded During Loading                            |      |
|--------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 124.01                                                       | Dry, $\gamma_{d,o}$ (pcf) = 104.00 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54;                     | <input type="checkbox"/> Other     | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No  |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/4/2008 Date: 4/4/2008 Final Calc. By: DH Date: 4/9/2008  
 Reviewed By: HP *HP*

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD9a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.680 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 19.58                    | 101.28                   | 86.0                         | 103.7                 | 104.0 |
| 2                | " Bottom, W2          | 19.25                    | 101.56                   | 85.2                         | 102.6                 | 102.9 |
| 3                | " Sides, W3           | 18.91                    | 101.85                   | 84.3                         | 101.4                 | 101.6 |
| 4                | " Average, W4         | 19.25                    | 101.56                   | 85.1                         | 102.6                 | 102.8 |
| 5                | " Back Calculated (1) | 19.69                    | 101.19 (3)               | 86.2                         | 104.1                 | 104.3 |
| 6                | Final                 | 16.42                    | 101.19 (2)               | 86.2                         | 104.1                 | 104.3 |

## Calculated Specific Gravity for Final Saturation = 100%:

Used Cal. Routine No. 5 to obtain the mass of dry soil  
 and final height by: ☒ Measurement; ☐ Dial Change.  
 Back Cal.  $G_s$  = 2.725  
 Avg.  $G_s$  (measured/assumed) & Back Cal.  $G_s$  = 2.703

## Calculation Constant, K

= (unit conversion) /  $G_s \times \rho_w \times A_r$

Estimated,  $K_e$  0.11783  
 Final Selected,  $K_f$  0.11783

## Calculated Mass Dry Soil for Final Saturation = 100%:

using measured/assumed  $G_s$

and final height by: ☒ Measurement; ☐ Dial Change.

Back Cal. Mass Dry Soil, (g) = 102.19

Avg. Back Calculated and Measured Mass Dry Soil (g) = 101.69

## Summary of Specimen Physical Properties

|                       |                      |               |                             |                                     |                                                                |                                    |                                                                      |                         |
|-----------------------|----------------------|---------------|-----------------------------|-------------------------------------|----------------------------------------------------------------|------------------------------------|----------------------------------------------------------------------|-------------------------|
| Specific Gravity      |                      |               | Assumed                     |                                     | To make $S_r = 100\%$ at end of test.                          |                                    |                                                                      |                         |
| $G_s = 2.680$         |                      | X             | Measured                    |                                     | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_r = 100\%$ |                                    |                                                                      |                         |
| Mass Dry Soil, (g)    | Initial: 101.19      | X             | From Cal. Routine No.       | 5                                   | Note: Routine #5 is based on final measurements.               |                                    |                                                                      |                         |
|                       | Final (4): NA        |               | Make $S_r = 100\%$ , or;    |                                     | Avg. of measured & make $S_r = 100\%$                          |                                    |                                                                      |                         |
| Initial Height (mm) = |                      |               | 19.22                       | X                                   | Measured ;                                                     |                                    | Back Calculated                                                      | Back-cal. Sat. (%) = NA |
| Final Height (mm) =   |                      |               | 16.81                       | X                                   | Measured ;                                                     |                                    | Initial $H_o$ & dial change during loading                           |                         |
|                       | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                              | Height of Solids, $H_s$ (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) |                         |
| Initial               | 19.7                 | 0.612         | 86.2                        | 124.0                               | 103.6                                                          | 11.923                             | From                                                                 | To (ksf)                |
| Final                 | 15.9                 | 0.409         | 104.1                       | 137.3                               | 118.5                                                          | NA                                 | NA                                                                   | NA                      |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 49 | Minus 200 (%) |
| Casagrande Method      | 15.70             | NA                                | 0.115 | 0.054 | 2.3 | Plastic Limit (PL)    | 14 | 77.0          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 35 |               |

NA - Indicates not applicable

## Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP HP

Date: 4/15/2008



# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD9a  
 Task No.: NA Date; Start: 4/4/2008 Initial Height,  $H_o$  (mm): 19.22  
 Project Name: Exelon (Victoria) Completed: 4/9/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7233  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.65522,  $V$ : 0.02312865 Piston Uplift,  $P_{up}$  (lbf): 34.73  
 Back Pressure,  $U_{b, CS}$  (psi): 70.68333,  $V$ : 0.02313793 Setup  $DT_{ref}$  (V): 0.04770969  
 Displacement Transducer No.: DT-103 Calib. Factor (mm/V): -213.848 Ch. No.: 7  
 Pore Press. Transducer No.: PT-108 Calib. Factor (psi/V): 3029.501 Ref. Zero (V): -0.000194 Ch. No.: 8  
 Force Cell No.: FT-103 Calib. Factor (lbf/V): 161103.256 Ref. Zero (V): 0.000104 Ch. No.: 9

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ), corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP *HP*

**Remarks:**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| S                            | 95                    | 14 : 09 : 00         |                                                                    | 0.19                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                 |
| BS                           | 95                    | 14 : 28 : 00         |                                                                    | 0.92                                                        |                                                            | 0.055                                                         | 0.019                                                                 | 0.036                                                                   |                                                                                 |
| BE                           | 96                    | 10 : 01 : 00         |                                                                    | 1.27                                                        | -0.004                                                     | 0.053                                                         | 0.030                                                                 | 0.023                                                                   |                                                                                 |
| CS                           | 96                    | 10 : 02 : 00         | 0                                                                  | 1.28                                                        | 0.000                                                      | 0.053                                                         | 0.030                                                                 | 0.023                                                                   |                                                                                 |
|                              | 96                    | 10 : 28 : 00         | 26                                                                 | 2.15                                                        | 0.094                                                      | 0.116                                                         | 0.050                                                                 | 0.066                                                                   | 0.509                                                                           |
|                              | 96                    | 10 : 54 : 00         | 52                                                                 | 2.66                                                        | 0.261                                                      | 0.182                                                         | 0.059                                                                 | 0.123                                                                   | 0.687                                                                           |
| US                           | 96                    | 11 : 22 : 00         | 80                                                                 | 3.28                                                        | 0.561                                                      | 0.252                                                         | 0.069                                                                 | 0.183                                                                   | 0.670                                                                           |
|                              | 96                    | 12 : 14 : 00         | 132                                                                | 4.66                                                        | 1.422                                                      | 0.358                                                         | 0.086                                                                 | 0.273                                                                   | 0.538                                                                           |
|                              | 96                    | 13 : 06 : 00         | 184                                                                | 6.67                                                        | 2.904                                                      | 0.463                                                         | 0.104                                                                 | 0.359                                                                   | 0.516                                                                           |
|                              | 96                    | 13 : 58 : 00         | 236                                                                | 8.57                                                        | 4.234                                                      | 0.558                                                         | 0.118                                                                 | 0.439                                                                   | 0.484                                                                           |
|                              | 96                    | 14 : 50 : 00         | 288                                                                | 11.37                                                       | 6.390                                                      | 0.658                                                         | 0.136                                                                 | 0.522                                                                   | 0.499                                                                           |
|                              | 96                    | 15 : 42 : 00         | 340                                                                | 14.27                                                       | 8.580                                                      | 0.756                                                         | 0.151                                                                 | 0.605                                                                   | 0.493                                                                           |
|                              | 96                    | 16 : 34 : 00         | 392                                                                | 17.40                                                       | 10.880                                                     | 0.854                                                         | 0.166                                                                 | 0.688                                                                   | 0.504                                                                           |
|                              | 96                    | 17 : 26 : 00         | 444                                                                | 20.69                                                       | 13.253                                                     | 0.951                                                         | 0.180                                                                 | 0.771                                                                   | 0.495                                                                           |
|                              | 96                    | 18 : 18 : 00         | 496                                                                | 24.03                                                       | 15.610                                                     | 1.048                                                         | 0.193                                                                 | 0.855                                                                   | 0.507                                                                           |
|                              | 96                    | 19 : 10 : 00         | 548                                                                | 27.70                                                       | 18.124                                                     | 1.143                                                         | 0.207                                                                 | 0.936                                                                   | 0.485                                                                           |
|                              | 96                    | 20 : 02 : 00         | 600                                                                | 31.69                                                       | 20.915                                                     | 1.240                                                         | 0.220                                                                 | 1.019                                                                   | 0.499                                                                           |
|                              | 96                    | 20 : 54 : 00         | 652                                                                | 35.96                                                       | 23.858                                                     | 1.335                                                         | 0.234                                                                 | 1.100                                                                   | 0.487                                                                           |
|                              | 96                    | 21 : 46 : 00         | 704                                                                | 40.39                                                       | 26.905                                                     | 1.430                                                         | 0.248                                                                 | 1.181                                                                   | 0.488                                                                           |
|                              | 96                    | 22 : 38 : 00         | 756                                                                | 45.07                                                       | 30.099                                                     | 1.524                                                         | 0.262                                                                 | 1.262                                                                   | 0.483                                                                           |
|                              | 96                    | 23 : 30 : 00         | 808                                                                | 49.79                                                       | 33.249                                                     | 1.617                                                         | 0.275                                                                 | 1.342                                                                   | 0.480                                                                           |
|                              | 97                    | 00 : 22 : 00         | 860                                                                | 54.95                                                       | 36.794                                                     | 1.712                                                         | 0.289                                                                 | 1.423                                                                   | 0.484                                                                           |
|                              | 97                    | 01 : 14 : 00         | 912                                                                | 60.00                                                       | 40.129                                                     | 1.804                                                         | 0.302                                                                 | 1.501                                                                   | 0.473                                                                           |
|                              | 97                    | 02 : 06 : 00         | 964                                                                | 65.50                                                       | 43.793                                                     | 1.896                                                         | 0.316                                                                 | 1.580                                                                   | 0.473                                                                           |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \varepsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| UE                           | 97                    | 02 : 30 : 00         | 988                                                                | 68.08                                                       | 45.518                                                     | 1.939                                                         | 0.323                                                                 | 1.617                                                                   | 0.476                                                                           |
|                              | 97                    | 02 : 32 : 00         | 990                                                                | 67.60                                                       | 45.149                                                     | 1.941                                                         | 0.322                                                                 | 1.619                                                                   | 0.429                                                                           |
|                              | 97                    | 04 : 52 : 00         | 1130                                                               | 44.61                                                       | 18.342                                                     | 1.973                                                         | 0.270                                                                 | 1.703                                                                   | 0.187                                                                           |
|                              | 97                    | 07 : 12 : 00         | 1270                                                               | 23.84                                                       | -1.810                                                     | 1.901                                                         | 0.214                                                                 | 1.686                                                                   | -0.038                                                                          |
|                              | 97                    | 09 : 32 : 00         | 1410                                                               | 12.24                                                       | -8.996                                                     | 1.801                                                         | 0.174                                                                 | 1.627                                                                   | -0.132                                                                          |
| US                           | 97                    | 11 : 52 : 00         | 1550                                                               | 6.16                                                        | -9.272                                                     | 1.676                                                         | 0.143                                                                 | 1.533                                                                   | -0.209                                                                          |
|                              | 97                    | 14 : 12 : 00         | 1690                                                               | 2.76                                                        | -9.168                                                     | 1.539                                                         | 0.113                                                                 | 1.426                                                                   | -0.240                                                                          |
|                              | 97                    | 16 : 32 : 00         | 1830                                                               | 0.86                                                        | -9.030                                                     | 1.398                                                         | 0.084                                                                 | 1.314                                                                   | -0.248                                                                          |
|                              | 97                    | 18 : 52 : 00         | 1970                                                               | 0.19                                                        | -8.568                                                     | 1.254                                                         | 0.119                                                                 | 1.134                                                                   | -0.402                                                                          |
| UE                           | 97                    | 19 : 32 : 00         | 2010                                                               | 0.13                                                        | -8.351                                                     | 1.210                                                         | 0.156                                                                 | 1.054                                                                   | -0.626                                                                          |
|                              | 97                    | 20 : 04 : 00         | 2042                                                               | 0.10                                                        | -8.157                                                     | 1.176                                                         | 0.188                                                                 | 0.988                                                                   | -0.644                                                                          |
|                              | 98                    | 01 : 52 : 00         | 2390                                                               | 0.09                                                        | -5.515                                                     | 0.911                                                         | 0.202                                                                 | 0.709                                                                   | -0.250                                                                          |
|                              | 98                    | 02 : 36 : 00         | 2434                                                               | 0.61                                                        | -4.888                                                     | 0.831                                                         | 0.081                                                                 | 0.750                                                                   | 0.292                                                                           |
|                              | 98                    | 03 : 14 : 00         | 2472                                                               | 1.68                                                        | -3.835                                                     | 0.908                                                         | 0.098                                                                 | 0.810                                                                   | 0.491                                                                           |
|                              | 98                    | 04 : 36 : 00         | 2554                                                               | 5.88                                                        | 0.344                                                      | 1.062                                                         | 0.141                                                                 | 0.922                                                                   | 0.425                                                                           |
| US                           | 98                    | 05 : 58 : 00         | 2636                                                               | 11.75                                                       | 6.122                                                      | 1.207                                                         | 0.172                                                                 | 1.035                                                                   | 0.431                                                                           |
|                              | 98                    | 07 : 20 : 00         | 2718                                                               | 19.22                                                       | 12.816                                                     | 1.346                                                         | 0.200                                                                 | 1.146                                                                   | 0.423                                                                           |
|                              | 98                    | 08 : 42 : 00         | 2800                                                               | 27.92                                                       | 20.095                                                     | 1.484                                                         | 0.226                                                                 | 1.258                                                                   | 0.424                                                                           |
|                              | 98                    | 10 : 04 : 00         | 2882                                                               | 37.09                                                       | 27.244                                                     | 1.621                                                         | 0.251                                                                 | 1.370                                                                   | 0.428                                                                           |
|                              | 98                    | 11 : 26 : 00         | 2964                                                               | 47.40                                                       | 34.767                                                     | 1.758                                                         | 0.277                                                                 | 1.482                                                                   | 0.425                                                                           |
|                              | 98                    | 12 : 48 : 00         | 3046                                                               | 57.69                                                       | 41.391                                                     | 1.893                                                         | 0.300                                                                 | 1.593                                                                   | 0.424                                                                           |
|                              | 98                    | 14 : 10 : 00         | 3128                                                               | 68.46                                                       | 47.630                                                     | 2.029                                                         | 0.323                                                                 | 1.705                                                                   | 0.428                                                                           |
|                              | 98                    | 15 : 32 : 00         | 3210                                                               | 79.61                                                       | 53.919                                                     | 2.167                                                         | 0.350                                                                 | 1.817                                                                   | 0.425                                                                           |
|                              | 98                    | 16 : 54 : 00         | 3292                                                               | 90.76                                                       | 60.653                                                     | 2.303                                                         | 0.374                                                                 | 1.929                                                                   | 0.426                                                                           |
|                              | 98                    | 18 : 16 : 00         | 3374                                                               | 101.48                                                      | 64.877                                                     | 2.444                                                         | 0.397                                                                 | 2.047                                                                   | 0.450                                                                           |
|                              | 98                    | 19 : 38 : 00         | 3456                                                               | 110.35                                                      | 65.863                                                     | 2.591                                                         | 0.415                                                                 | 2.176                                                                   | 0.492                                                                           |
|                              | 98                    | 21 : 00 : 00         | 3538                                                               | 119.11                                                      | 64.685                                                     | 2.741                                                         | 0.432                                                                 | 2.309                                                                   | 0.506                                                                           |
|                              | 98                    | 22 : 22 : 00         | 3620                                                               | 127.17                                                      | 63.898                                                     | 2.884                                                         | 0.447                                                                 | 2.437                                                                   | 0.487                                                                           |
|                              | 98                    | 23 : 44 : 00         | 3702                                                               | 137.71                                                      | 66.512                                                     | 3.022                                                         | 0.467                                                                 | 2.555                                                                   | 0.451                                                                           |
|                              | 99                    | 01 : 06 : 00         | 3784                                                               | 148.57                                                      | 67.092                                                     | 3.159                                                         | 0.486                                                                 | 2.673                                                                   | 0.448                                                                           |
|                              | 99                    | 02 : 28 : 00         | 3866                                                               | 160.47                                                      | 66.418                                                     | 3.294                                                         | 0.506                                                                 | 2.787                                                                   | 0.435                                                                           |
|                              | 99                    | 03 : 50 : 00         | 3948                                                               | 172.41                                                      | 66.697                                                     | 3.427                                                         | 0.526                                                                 | 2.901                                                                   | 0.430                                                                           |
|                              | 99                    | 05 : 12 : 00         | 4030                                                               | 185.05                                                      | 65.493                                                     | 3.556                                                         | 0.546                                                                 | 3.010                                                                   | 0.415                                                                           |
|                              | 99                    | 05 : 38 : 00         | 4056                                                               | 188.37                                                      | 63.112                                                     | 3.596                                                         | 0.552                                                                 | 3.045                                                                   | 0.420                                                                           |
| UE                           | 99                    | 05 : 40 : 00         | 4058                                                               | 187.88                                                      | 62.963                                                     | 3.598                                                         | 0.551                                                                 | 3.047                                                                   | 0.440                                                                           |
|                              | 99                    | 08 : 24 : 00         | 4222                                                               | 170.40                                                      | 52.533                                                     | 3.648                                                         | 0.525                                                                 | 3.123                                                                   | 0.144                                                                           |
|                              | 99                    | 11 : 08 : 00         | 4386                                                               | 136.70                                                      | 18.781                                                     | 3.602                                                         | 0.472                                                                 | 3.130                                                                   | 0.013                                                                           |
|                              | 99                    | 13 : 52 : 00         | 4550                                                               | 104.54                                                      | -5.208                                                     | 3.528                                                         | 0.417                                                                 | 3.111                                                                   | -0.036                                                                          |
|                              | 99                    | 16 : 36 : 00         | 4714                                                               | 77.14                                                       | -9.349                                                     | 3.433                                                         | 0.366                                                                 | 3.067                                                                   | -0.083                                                                          |
| US                           | 99                    | 19 : 20 : 00         | 4878                                                               | 55.53                                                       | -9.310                                                     | 3.319                                                         | 0.320                                                                 | 2.999                                                                   | -0.130                                                                          |
|                              | 99                    | 22 : 04 : 00         | 5042                                                               | 39.14                                                       | -9.428                                                     | 3.193                                                         | 0.281                                                                 | 2.913                                                                   | -0.165                                                                          |
|                              | 100                   | 00 : 48 : 00         | 5206                                                               | 26.94                                                       | -9.706                                                     | 3.057                                                         | 0.248                                                                 | 2.809                                                                   | -0.197                                                                          |

## CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-3 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD9  
 Task No.: NA Date; Start: 4/4/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.7 Piston Uplift,  $P_{up}$  (lbf): 34.73  
 Project Name: Exelon (Victoria) Completed: 4/9/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg  
 Final Description of Specimen: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL) 0  
 Ring No.: 3 Area,  $A_r$  (cm<sup>2</sup>): 31.723 Solids Ht.,  $H_s$  (mm): 11.923 Specific Gravity,  $G_s =$  2.680 ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.22 Water 19.7 Void 0.612 Deg. of 86.2 Total Unit 124.0 Dry Unit 103.6  
**Final:** (mm):  $H_f$ : 16.81 Content,  $w$  (%): 15.9 Ratio,  $e$ : 0.409 Sat.,  $S$  (%): 104.1 Weight,  $\gamma_t$  (pcf): 137.3 Weight,  $\gamma_d$  (pcf): 118.5

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *MP*

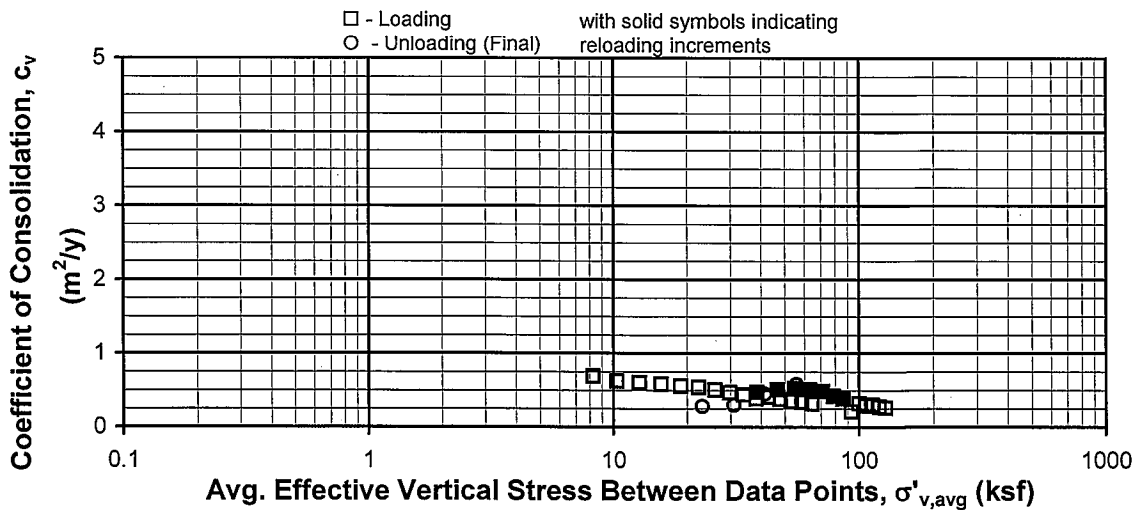
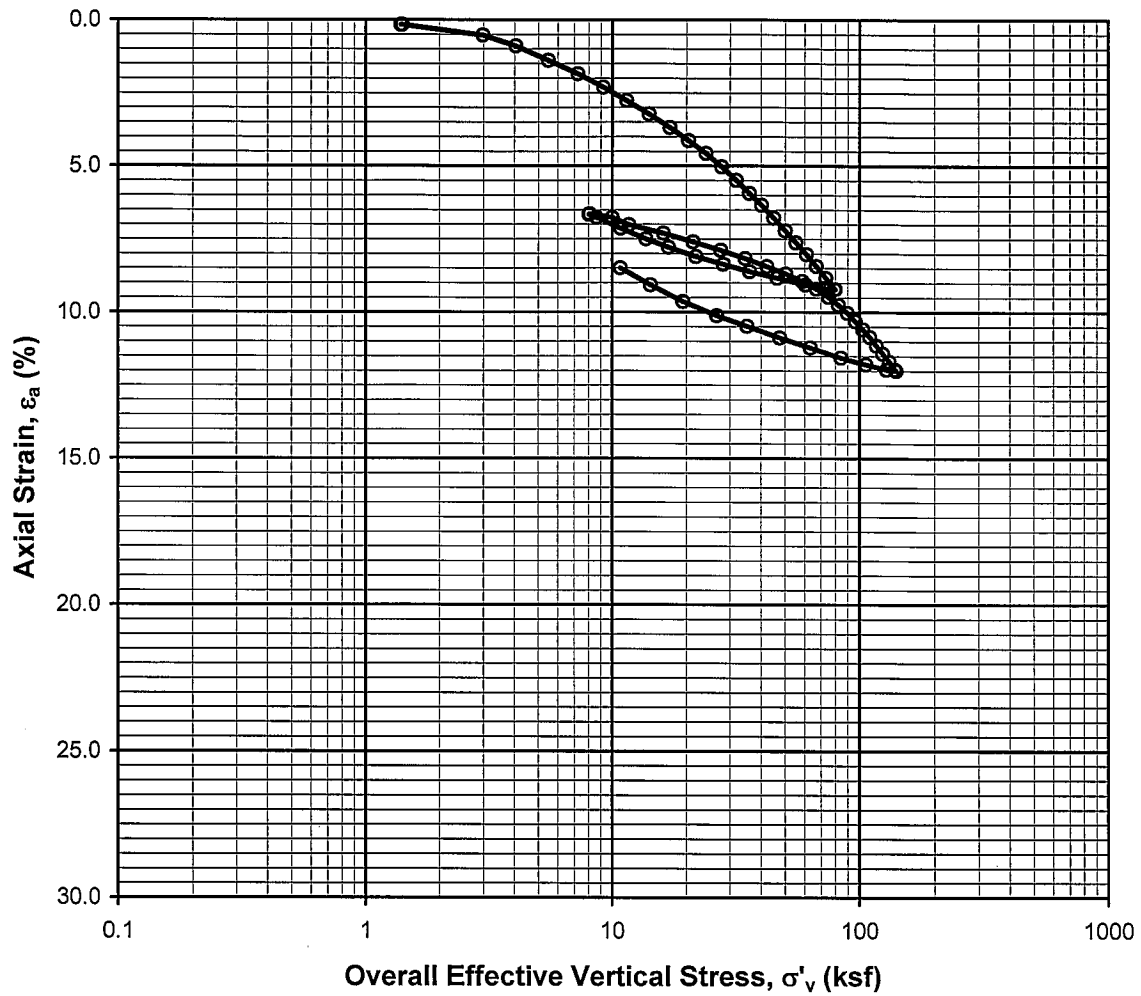
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.19                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | 0.19                                                                                                                  | 0.609                              | 0.92                                                    |                                                                |                                                                                         | 19.182                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 1.27                                                                    | 0.12                                                                                                                  | 0.610                              | 1.27                                                    | -0.004                                                         | -0.3                                                                                    | 19.195                                                |                                                                           |                                                                     | 0.609                                  |                                                   |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 1.28                                                                    | 0.12                                                                                                                  | 0.610                              | 1.28                                                    | 0.000                                                          | 0.0                                                                                     | 19.195                                                |                                                                           |                                                                     | 0.610                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 26                                                                       | 2.08                                                                    | 0.34                                                                                                                  | 0.606                              | 2.15                                                    | 0.094                                                          | 4.4                                                                                     | 19.152                                                | 1.68                                                                      |                                                                     | 0.608                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 52                                                                       | 2.49                                                                    | 0.64                                                                                                                  | 0.601                              | 2.66                                                    | 0.261                                                          | 9.8                                                                                     | 19.095                                                | 2.28                                                                      |                                                                     | 0.604                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 80                                                                       | 2.89                                                                    | 0.95                                                                                                                  | 0.596                              | 3.28                                                    | 0.561                                                          | 17.1                                                                                    | 19.035                                                | 2.69                                                                      |                                                                     | 0.599                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 132                                                                      | 3.66                                                                    | 1.42                                                                                                                  | 0.589                              | 4.66                                                    | 1.422                                                          | 30.5                                                                                    | 18.945                                                | 3.27                                                                      | 2.23                                                                | 0.593                                  | 1.85E-03                                          | 1.23                                                                                           |                                                                                                  |
|                              | 184                                                                      | 4.55                                                                    | 1.87                                                                                                                  | 0.582                              | 6.67                                                    | 2.904                                                          | 43.6                                                                                    | 18.859                                                | 4.10                                                                      | 1.34                                                                | 0.585                                  | 8.36E-04                                          | 1.49                                                                                           |                                                                                                  |
|                              | 236                                                                      | 5.44                                                                    | 2.29                                                                                                                  | 0.575                              | 8.57                                                    | 4.234                                                          | 49.4                                                                                    | 18.779                                                | 5.00                                                                      | 0.71                                                                | 0.578                                  | 4.86E-04                                          | 1.19                                                                                           |                                                                                                  |
|                              | 288                                                                      | 6.55                                                                    | 2.72                                                                                                                  | 0.568                              | 11.37                                                   | 6.390                                                          | 56.2                                                                                    | 18.696                                                | 6.00                                                                      | 0.66                                                                | 0.571                                  | 3.43E-04                                          | 1.48                                                                                           |                                                                                                  |
|                              | 340                                                                      | 7.73                                                                    | 3.15                                                                                                                  | 0.561                              | 14.27                                                   | 8.580                                                          | 60.1                                                                                    | 18.613                                                | 7.14                                                                      | 0.46                                                                | 0.565                                  | 2.45E-04                                          | 1.30                                                                                           |                                                                                                  |
|                              | 392                                                                      | 9.04                                                                    | 3.58                                                                                                                  | 0.554                              | 17.40                                                   | 10.880                                                         | 62.5                                                                                    | 18.530                                                | 8.39                                                                      | 0.36                                                                | 0.558                                  | 1.94E-04                                          | 1.25                                                                                           |                                                                                                  |
|                              | 444                                                                      | 10.45                                                                   | 4.01                                                                                                                  | 0.547                              | 20.69                                                   | 13.253                                                         | 64.1                                                                                    | 18.447                                                | 9.75                                                                      | 0.30                                                                | 0.551                                  | 1.55E-04                                          | 1.21                                                                                           |                                                                                                  |
|                              | 496                                                                      | 11.95                                                                   | 4.45                                                                                                                  | 0.540                              | 24.03                                                   | 15.610                                                         | 65.0                                                                                    | 18.363                                                | 11.20                                                                     | 0.25                                                                | 0.544                                  | 1.32E-04                                          | 1.16                                                                                           |                                                                                                  |
|                              | 548                                                                      | 13.64                                                                   | 4.87                                                                                                                  | 0.533                              | 27.70                                                   | 18.124                                                         | 65.4                                                                                    | 18.282                                                | 12.79                                                                     | 0.23                                                                | 0.537                                  | 1.08E-04                                          | 1.21                                                                                           |                                                                                                  |
|                              | 600                                                                      | 15.44                                                                   | 5.30                                                                                                                  | 0.526                              | 31.69                                                   | 20.915                                                         | 66.0                                                                                    | 18.199                                                | 14.54                                                                     | 0.21                                                                | 0.530                                  | 9.53E-05                                          | 1.26                                                                                           |                                                                                                  |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

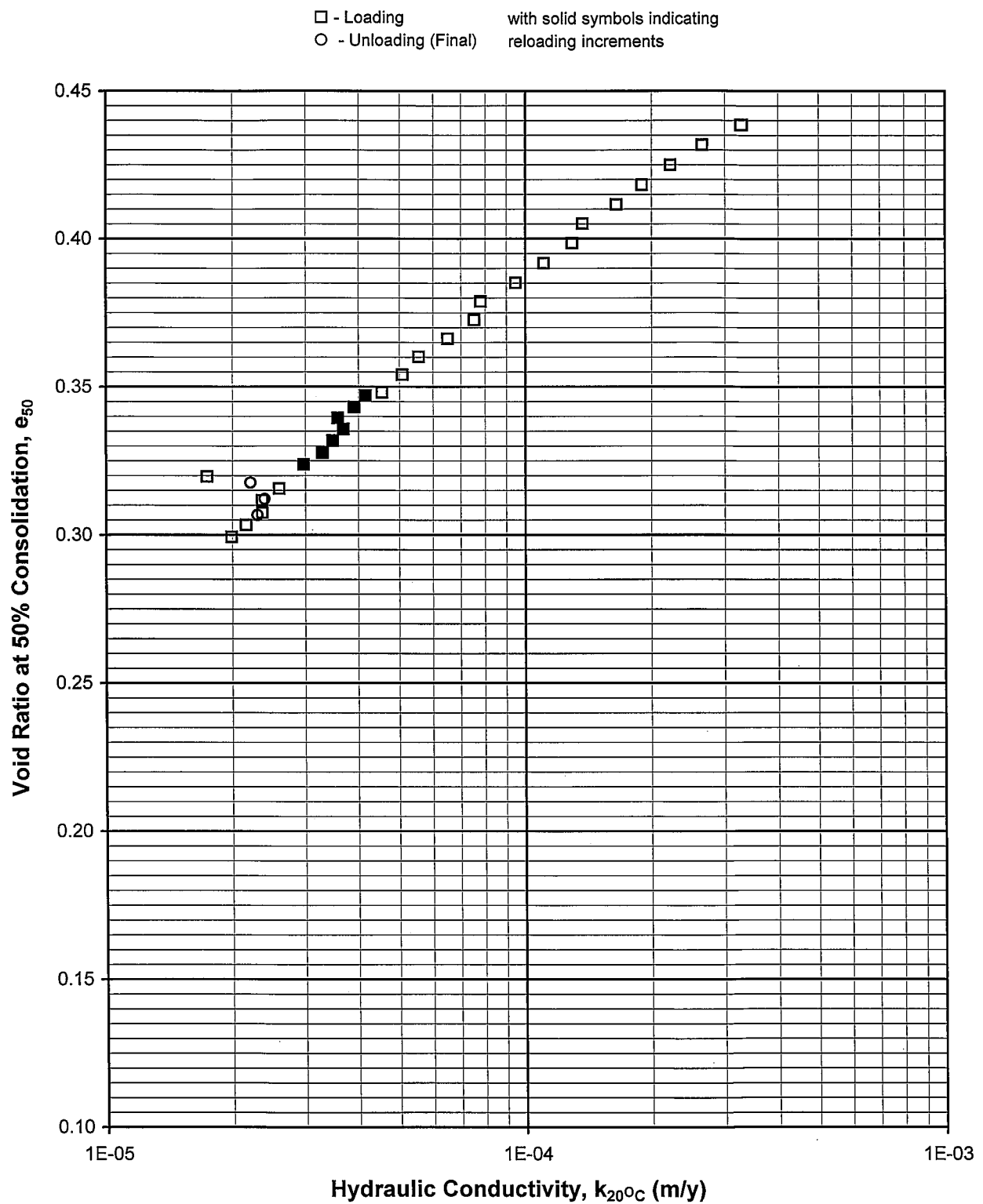
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 652                                                                      | 17.39                                                                   | 5.72                                                                                                                        | 0.520                              | 35.96                                                   | 23.858                                                         | 66.4                                                                                    | 18.118                                                | 16.42                                                                     | 0.19                                                                | 0.523                                  | 8.06E-05                                          | 1.28                                                                                           |                                                                                                        |
|                              | 704                                                                      | 19.44                                                                   | 6.15                                                                                                                        | 0.513                              | 40.39                                                   | 26.905                                                         | 66.6                                                                                    | 18.037                                                | 18.42                                                                     | 0.18                                                                | 0.516                                  | 7.08E-05                                          | 1.28                                                                                           |                                                                                                        |
|                              | 756                                                                      | 21.62                                                                   | 6.57                                                                                                                        | 0.506                              | 45.07                                                   | 30.099                                                         | 66.8                                                                                    | 17.956                                                | 20.53                                                                     | 0.16                                                                | 0.509                                  | 6.20E-05                                          | 1.30                                                                                           |                                                                                                        |
|                              | 808                                                                      | 23.88                                                                   | 6.98                                                                                                                        | 0.499                              | 49.79                                                   | 33.249                                                         | 66.8                                                                                    | 17.876                                                | 22.75                                                                     | 0.15                                                                | 0.503                                  | 5.50E-05                                          | 1.26                                                                                           |                                                                                                        |
|                              | 860                                                                      | 26.26                                                                   | 7.40                                                                                                                        | 0.492                              | 54.95                                                   | 36.794                                                         | 67.0                                                                                    | 17.795                                                | 25.07                                                                     | 0.14                                                                | 0.496                                  | 4.98E-05                                          | 1.34                                                                                           |                                                                                                        |
|                              | 912                                                                      | 28.72                                                                   | 7.81                                                                                                                        | 0.486                              | 60.00                                                   | 40.129                                                         | 66.9                                                                                    | 17.717                                                | 27.49                                                                     | 0.13                                                                | 0.489                                  | 4.39E-05                                          | 1.27                                                                                           |                                                                                                        |
|                              | 964                                                                      | 31.37                                                                   | 8.22                                                                                                                        | 0.479                              | 65.50                                                   | 43.793                                                         | 66.9                                                                                    | 17.638                                                | 30.04                                                                     | 0.13                                                                | 0.483                                  | 3.98E-05                                          | 1.35                                                                                           |                                                                                                        |
| UE                           | 988                                                                      | 32.60                                                                   | 8.41                                                                                                                        | 0.476                              | 68.08                                                   | 45.518                                                         | 66.9                                                                                    | 17.601                                                | 31.99                                                                     | 0.12                                                                | 0.478                                  | 3.74E-05                                          | 1.32                                                                                           |                                                                                                        |
|                              | 990                                                                      | 32.42                                                                   | 8.43                                                                                                                        | 0.476                              | 67.60                                                   | 45.149                                                         | 66.8                                                                                    | 17.599                                                | 32.51                                                                     |                                                                     | 0.476                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1130                                                                     | 31.34                                                                   | 8.86                                                                                                                        | 0.469                              | 44.61                                                   | 18.342                                                         | 41.1                                                                                    | 17.515                                                | 31.88                                                                     |                                                                     | 0.472                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1270                                                                     | 25.03                                                                   | 8.77                                                                                                                        | 0.470                              | 23.84                                                   | -1.810                                                         | -7.6                                                                                    | 17.532                                                | 28.19                                                                     |                                                                     | 0.470                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1410                                                                     | 17.68                                                                   | 8.47                                                                                                                        | 0.475                              | 12.24                                                   | -8.996                                                         | -73.5                                                                                   | 17.591                                                | 21.35                                                                     |                                                                     | 0.473                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 1550                                                                     | 11.36                                                                   | 7.98                                                                                                                        | 0.483                              | 6.16                                                    | -9.272                                                         | -150.6                                                                                  | 17.685                                                | 14.52                                                                     |                                                                     | 0.479                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1690                                                                     | 7.33                                                                    | 7.42                                                                                                                        | 0.492                              | 2.76                                                    | -9.168                                                         | -331.6                                                                                  | 17.792                                                | 9.34                                                                      |                                                                     | 0.488                                  |                                                   | 0.71                                                                                           |                                                                                                        |
|                              | 1830                                                                     | 4.39                                                                    | 6.84                                                                                                                        | 0.502                              | 0.86                                                    | -9.030                                                         | -1045.1                                                                                 | 17.904                                                | 5.86                                                                      | 0.39                                                                | 0.497                                  | 6.72E-05                                          | 1.30                                                                                           |                                                                                                        |
|                              | 1970                                                                     | 2.43                                                                    | 5.90                                                                                                                        | 0.517                              | 0.19                                                    | -8.568                                                         | -4587.7                                                                                 | 18.084                                                | 3.41                                                                      | 0.32                                                                | 0.509                                  | 1.19E-04                                          | 1.60                                                                                           |                                                                                                        |
| UE                           | 2010                                                                     | 2.10                                                                    | 5.48                                                                                                                        | 0.523                              | 0.13                                                    | -8.351                                                         | -6503.4                                                                                 | 18.164                                                | 2.26                                                                      | 0.20                                                                | 0.520                                  | 2.03E-04                                          | 1.08                                                                                           |                                                                                                        |
|                              | 2042                                                                     | 1.90                                                                    | 5.14                                                                                                                        | 0.529                              | 0.10                                                    | -8.157                                                         | -8053.8                                                                                 | 18.230                                                | 2.00                                                                      |                                                                     | 0.526                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2390                                                                     | 1.43                                                                    | 3.69                                                                                                                        | 0.552                              | 0.09                                                    | -5.515                                                         | -5943.1                                                                                 | 18.509                                                | 1.67                                                                      |                                                                     | 0.541                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2434                                                                     | 2.65                                                                    | 3.90                                                                                                                        | 0.549                              | 0.61                                                    | -4.888                                                         | -795.2                                                                                  | 18.468                                                | 2.04                                                                      |                                                                     | 0.551                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2472                                                                     | 3.72                                                                    | 4.21                                                                                                                        | 0.544                              | 1.68                                                    | -3.835                                                         | -227.7                                                                                  | 18.408                                                | 3.18                                                                      |                                                                     | 0.546                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2554                                                                     | 5.64                                                                    | 4.80                                                                                                                        | 0.534                              | 5.88                                                    | 0.344                                                          | 5.9                                                                                     | 18.296                                                | 4.68                                                                      |                                                                     | 0.539                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 2636                                                                     | 7.19                                                                    | 5.38                                                                                                                        | 0.525                              | 11.75                                                   | 6.122                                                          | 52.1                                                                                    | 18.183                                                | 6.42                                                                      |                                                                     | 0.530                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 2718                                                                     | 9.23                                                                    | 5.96                                                                                                                        | 0.516                              | 19.22                                                   | 12.816                                                         | 66.7                                                                                    | 18.072                                                | 8.21                                                                      |                                                                     | 0.520                                  |                                                   | 0.52                                                                                           |                                                                                                        |
|                              | 2800                                                                     | 11.96                                                                   | 6.54                                                                                                                        | 0.506                              | 27.92                                                   | 20.095                                                         | 72.0                                                                                    | 17.960                                                | 10.60                                                                     |                                                                     | 0.511                                  |                                                   | 0.62                                                                                           |                                                                                                        |
|                              | 2882                                                                     | 15.32                                                                   | 7.13                                                                                                                        | 0.497                              | 37.09                                                   | 27.244                                                         | 73.5                                                                                    | 17.848                                                | 13.64                                                                     |                                                                     | 0.502                                  |                                                   | 0.65                                                                                           |                                                                                                        |
|                              | 2964                                                                     | 19.63                                                                   | 7.71                                                                                                                        | 0.488                              | 47.40                                                   | 34.767                                                         | 73.3                                                                                    | 17.736                                                | 17.48                                                                     |                                                                     | 0.492                                  |                                                   | 0.74                                                                                           |                                                                                                        |
|                              | 3046                                                                     | 24.84                                                                   | 8.29                                                                                                                        | 0.478                              | 57.69                                                   | 41.391                                                         | 71.7                                                                                    | 17.625                                                | 22.24                                                                     |                                                                     | 0.483                                  |                                                   | 0.76                                                                                           |                                                                                                        |
|                              | 3128                                                                     | 30.97                                                                   | 8.87                                                                                                                        | 0.469                              | 68.46                                                   | 47.630                                                         | 69.6                                                                                    | 17.513                                                | 27.90                                                                     |                                                                     | 0.473                                  |                                                   | 0.84                                                                                           |                                                                                                        |
|                              | 3210                                                                     | 37.45                                                                   | 9.45                                                                                                                        | 0.459                              | 79.61                                                   | 53.919                                                         | 67.7                                                                                    | 17.401                                                | 34.21                                                                     |                                                                     | 0.464                                  |                                                   | 0.91                                                                                           |                                                                                                        |

## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-10A - Depth 63.0 - 65.5 ft  
 Boring B-2321UD



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-10A - Depth 63.0 - 65.5 ft  
 Boring B-2321UD



# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2321\_UD10a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.670 ☒ Meas.; ☐ Assumed Ring No.: 17  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.682  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                          |                                           |                                |                                   |                                  |                                           |                         |
|------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                     | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-10                        | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 63.0 - 65.5                  | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) =           | Dia. (in.) =            |
| Spec. Selection by X-ray;                | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                             | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                               | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                    |                                | Mass Moist Soil + Ring (g)                           | 346.51  | 344.43 |
| Container No.                                            | 863                         | 901              | 2008                                          | 752                            | Mass Ring (g)                                        | 217.42  |        |
| Mass Moist Soil + Container (g)                          | 124.87                      | 123.78           | 87.02                                         | 61.26                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 129.09  | 127.01 |
| Mass Dry Soil + Container (g)                            | 113.37                      | 113.29           | 80.08                                         | 57.91                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 31.63                       | 32.04            | 30.56                                         | 31.99                          | Container No.                                        | 892     |        |
| WATER CONTENT (%)                                        | 14.07                       | 12.91            | 14.01                                         | 12.92                          | Mass Dry Soil + Container (g)                        | 31.76   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 13.66                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> X Slice ; | Whole Spec.                    | Mass Container (g)                                   | 31.71   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                               |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.05    |        |

| Soil Height: Measurements (mm)                                                                                                                                              |                                          |                                             |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                     |                                          | Final                                       |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 0.000  |
| with Spec.                                                                                                                                                                  | without Spec.                            | with Spec.                                  | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.240                                                                                                                                                                      | 0.000                                    | 24.240                                      | 6.510                       | Avg. Reading on Soil, $d_{soil}$                        |  | 19.216                                                              | 24.244 |
| 19.230                                                                                                                                                                      | 0.000                                    | 24.210                                      | 6.520                       | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 6.454  |
| 19.190                                                                                                                                                                      | 0.000                                    | 24.280                                      | 6.520                       | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.216                                                              | 17.790 |
| 19.190                                                                                                                                                                      | 0.000                                    | 24.290                                      | 6.380                       | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.230                                                                                                                                                                      | 0.000                                    | 24.200                                      | 6.340                       | Initial Height, $H_o$                                   |  | 19.216                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                              | <input checked="" type="checkbox"/> X No | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                              | <input checked="" type="checkbox"/> X No | <input checked="" type="checkbox"/> X Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec.: ~ 12.7 mm; CRS ~ 25 mm |                                          |                                             |                             | Final Soil Height Measurement, $H_{f,m}$                |  | 17.790                                                              |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                         |                                          |                                             |                             | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$   |  | -1.07                                                               |        |

| Estimated Initial Unit Weight                                                               |                                | Soil Extruded During Loading                            |      |
|---------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                               | 132.37                         | Container No.                                           |      |
| Dry, $\gamma_{d,o}$ (pcf) =                                                                 | 116.46                         | Mass Dry Soil + Cont. (g)                               | NA   |
| Filter Paper Used: <input checked="" type="checkbox"/> X Whatman No. 54;                    | <input type="checkbox"/> Other | Mass Cont. (g)                                          | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No  |                                | Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g) | 0.00 |
| CRS Test: Top Only: <input checked="" type="checkbox"/> X Yes ; <input type="checkbox"/> No |                                |                                                         |      |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Olive Gray Sandy Lean CLAY (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/1/2008 Date: 4/1/2008 Final Calc. By: DH Date: 4/8/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2321\_UD10a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.670 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 14.07                    | 113.17                   | 86.6                         | 99.8                  | 104.7 |
| 2                | " Bottom, W2          | 12.91                    | 114.33                   | 82.2                         | 94.3                  | 99.1  |
| 3                | " Sides, W3           | 14.01                    | 113.22                   | 86.4                         | 99.5                  | 104.4 |
| 4                | " Average, W4         | 13.66                    | 113.57                   | 85.1                         | 97.9                  | 102.8 |
| 5                | " Back Calculated (1) | 14.72                    | 112.52 (3)               | 88.9                         | 102.6                 | 107.6 |
| 6                | Final                 | 12.92                    | 112.52 (2)               | 88.9                         | 102.6                 | 107.6 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. 5                                                                                     | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = 2.694                                                                                     |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.682                                                     |                                |

|                                                                              |         |
|------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times p_w \times A_r$ |         |
| Estimated, $K_s$                                                             | 0.11843 |
| Final Selected, $K_f$                                                        | 0.11843 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 113.11                                                                       |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 112.82                                                |  |                              |

| Summary of Specimen Physical Properties    |                            |                  |                                   |                                               |                                                                                          |                                                   |                                                                              |                                                     |                         |
|--------------------------------------------|----------------------------|------------------|-----------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------|
| Specific Gravity<br>G <sub>s</sub> = 2.670 |                            |                  | Assumed                           |                                               | To make S <sub>f</sub> = 100% at end of test.                                            |                                                   |                                                                              |                                                     |                         |
|                                            |                            | X                | Measured                          |                                               | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                   |                                                                              |                                                     |                         |
| Mass Dry<br>Soil, (g)                      | Initial: 112.52            |                  | X                                 | From Cal. Routine No. 5                       |                                                                                          | Note: Routine #5 is based on final measurements.  |                                                                              |                                                     |                         |
|                                            | Final (4): NA              |                  |                                   | Make S <sub>f</sub> = 100%, or;               |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%     |                                                                              |                                                     |                         |
| Initial Height (mm) =                      |                            |                  | 19.22                             | X                                             | Measured ;                                                                               |                                                   |                                                                              | Back Calculated                                     | Back-cal. Sat. (%) = NA |
| Final Height (mm) =                        |                            |                  | 17.79                             | X                                             | Measured ;                                                                               |                                                   |                                                                              | Initial H <sub>o</sub> & dial change during loading |                         |
|                                            | Water<br>Content, w<br>(%) | Void Ratio,<br>e | Degree of<br>Saturation, S<br>(%) | Total Unit<br>Weight, γ <sub>t</sub><br>(pcf) | Dry Unit<br>Weight, γ <sub>d</sub><br>(pcf)                                              | Height of<br>Solids, H <sub>s</sub> (2,4)<br>(mm) | Extruded soil loss proportioned in<br>increasing loading increments (5)<br>: |                                                     |                         |
| Initial                                    | 14.7                       | 0.442            | 88.9                              | 132.4                                         | 115.4                                                                                    | 13.326                                            | From                                                                         | To (ksf)                                            |                         |
| Final                                      | 12.9                       | 0.335            | 102.6                             | 140.7                                         | 124.6                                                                                    | NA                                                | NA                                                                           | NA                                                  |                         |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 36 | Minus 200 (%) |
| Casagrande Method      | 31.00             | NA                                | 0.110 | 0.029 | 4.3 | Plastic Limit (PL)    | 14 | 60.1          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 22 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP **HP**

Date: 4/11/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2321\_UD10a  
 Task No.: NA Date; Start: 4/1/2008 Initial Height,  $H_o$  (mm): 19.22  
 Project Name: Exelon (Victoria) Completed: 4/8/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6819  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 69.96667,  $V$ : 0.023059831 Piston Uplift,  $P_{up}$  (lbf): 34.36  
 Back Pressure,  $U_{b, CS}$  (psi): 69.97429,  $V$ : 0.023062352 Setup  $DT_{ref}$  (V): 0.000991781  
 Displacement Transducer No.: DT-100 Calib. Factor (mm/V): 376.22281 Ch. No.: 2  
 Pore Press. Transducer No.: PT-124 Calib. Factor (psi/V): 3022.80878 Ref. Zero (V): -0.000086 Ch. No.: 3  
 Force Cell No.: FT-109 Calib. Factor (lbf/V): -154608.61 Ref. Zero (V): -0.001415 Ch. No.: 1

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 92                    | 17 : 24 : 11         |                                                                    | 0.26                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 92                    | 17 : 39 : 15         |                                                                    | 0.79                                                        |                                                            | 0.040                                                         | 0.000                                                                 | 0.040                                                                   |                                                                              |
| BE                           | 93                    | 09 : 03 : 18         |                                                                    | 1.39                                                        | -0.001                                                     | 0.031                                                         | 0.000                                                                 | 0.031                                                                   |                                                                              |
| CS                           | 93                    | 09 : 03 : 22         | 0                                                                  | 1.41                                                        | 0.000                                                      | 0.031                                                         | 0.000                                                                 | 0.031                                                                   |                                                                              |
|                              | 93                    | 09 : 41 : 27         | 38                                                                 | 3.56                                                        | 0.830                                                      | 0.101                                                         | 0.000                                                                 | 0.101                                                                   | 0.575                                                                        |
|                              | 93                    | 10 : 49 : 27         | 106                                                                | 4.82                                                        | 1.101                                                      | 0.173                                                         | 0.000                                                                 | 0.173                                                                   | 0.330                                                                        |
| US                           | 93                    | 12 : 39 : 28         | 216                                                                | 6.62                                                        | 1.640                                                      | 0.266                                                         | 0.000                                                                 | 0.266                                                                   | 0.263                                                                        |
|                              | 93                    | 14 : 29 : 30         | 326                                                                | 8.82                                                        | 2.277                                                      | 0.355                                                         | 0.000                                                                 | 0.355                                                                   | 0.253                                                                        |
|                              | 93                    | 16 : 19 : 32         | 436                                                                | 11.21                                                       | 2.838                                                      | 0.444                                                         | 0.000                                                                 | 0.444                                                                   | 0.251                                                                        |
|                              | 93                    | 18 : 09 : 34         | 546                                                                | 13.87                                                       | 3.414                                                      | 0.532                                                         | 0.000                                                                 | 0.532                                                                   | 0.250                                                                        |
|                              | 93                    | 19 : 59 : 35         | 656                                                                | 16.93                                                       | 3.961                                                      | 0.620                                                         | 0.000                                                                 | 0.620                                                                   | 0.251                                                                        |
|                              | 93                    | 21 : 49 : 36         | 766                                                                | 20.31                                                       | 4.484                                                      | 0.708                                                         | 0.000                                                                 | 0.708                                                                   | 0.248                                                                        |
|                              | 93                    | 23 : 39 : 37         | 876                                                                | 23.95                                                       | 5.047                                                      | 0.795                                                         | 0.000                                                                 | 0.795                                                                   | 0.247                                                                        |
|                              | 94                    | 01 : 29 : 40         | 986                                                                | 27.97                                                       | 5.734                                                      | 0.878                                                         | 0.000                                                                 | 0.878                                                                   | 0.234                                                                        |
|                              | 94                    | 03 : 19 : 40         | 1096                                                               | 32.29                                                       | 6.526                                                      | 0.967                                                         | 0.000                                                                 | 0.967                                                                   | 0.255                                                                        |
|                              | 94                    | 05 : 09 : 42         | 1206                                                               | 36.85                                                       | 7.338                                                      | 1.055                                                         | 0.000                                                                 | 1.055                                                                   | 0.249                                                                        |
|                              | 94                    | 06 : 59 : 43         | 1316                                                               | 41.71                                                       | 8.310                                                      | 1.140                                                         | 0.000                                                                 | 1.140                                                                   | 0.243                                                                        |
|                              | 94                    | 08 : 49 : 44         | 1426                                                               | 46.48                                                       | 8.957                                                      | 1.219                                                         | 0.000                                                                 | 1.219                                                                   | 0.223                                                                        |
|                              | 94                    | 10 : 39 : 45         | 1536                                                               | 52.11                                                       | 10.127                                                     | 1.303                                                         | 0.000                                                                 | 1.303                                                                   | 0.240                                                                        |
|                              | 94                    | 12 : 29 : 47         | 1646                                                               | 57.99                                                       | 11.185                                                     | 1.386                                                         | 0.000                                                                 | 1.386                                                                   | 0.234                                                                        |
|                              | 94                    | 14 : 19 : 48         | 1756                                                               | 63.98                                                       | 12.339                                                     | 1.464                                                         | 0.000                                                                 | 1.464                                                                   | 0.222                                                                        |
|                              | 94                    | 16 : 09 : 50         | 1866                                                               | 70.42                                                       | 13.417                                                     | 1.543                                                         | 0.000                                                                 | 1.543                                                                   | 0.224                                                                        |
| UE                           | 94                    | 17 : 59 : 51         | 1976                                                               | 77.04                                                       | 14.514                                                     | 1.620                                                         | 0.000                                                                 | 1.620                                                                   | 0.220                                                                        |
|                              | 94                    | 19 : 49 : 53         | 2087                                                               | 84.29                                                       | 15.773                                                     | 1.698                                                         | 0.000                                                                 | 1.698                                                                   | 0.220                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 94                    | 21 : 34 : 38         | 2191                                                               | 91.71                                                       | 16.926                                                     | 1.771                                                         | 0.000                                                                 | 1.771                                                                   | 0.217                                                                        |
|                              | 94                    | 21 : 39 : 54         | 2197                                                               | 90.55                                                       | 15.946                                                     | 1.770                                                         | 0.000                                                                 | 1.770                                                                   | -0.023                                                                       |
|                              | 95                    | 00 : 49 : 57         | 2387                                                               | 70.93                                                       | -1.332                                                     | 1.765                                                         | 0.000                                                                 | 1.765                                                                   | -0.010                                                                       |
|                              | 95                    | 03 : 59 : 59         | 2577                                                               | 59.12                                                       | -2.373                                                     | 1.742                                                         | 0.000                                                                 | 1.742                                                                   | -0.036                                                                       |
| US                           | 95                    | 07 : 10 : 00         | 2767                                                               | 43.17                                                       | -5.155                                                     | 1.698                                                         | 0.000                                                                 | 1.698                                                                   | -0.072                                                                       |
|                              | 95                    | 10 : 21 : 04         | 2958                                                               | 33.18                                                       | -4.334                                                     | 1.654                                                         | 0.000                                                                 | 1.654                                                                   | -0.072                                                                       |
|                              | 95                    | 13 : 31 : 06         | 3148                                                               | 24.82                                                       | -5.292                                                     | 1.608                                                         | 0.000                                                                 | 1.608                                                                   | -0.076                                                                       |
|                              | 95                    | 16 : 41 : 08         | 3338                                                               | 18.14                                                       | -5.902                                                     | 1.556                                                         | 0.000                                                                 | 1.556                                                                   | -0.085                                                                       |
|                              | 95                    | 19 : 51 : 10         | 3528                                                               | 12.99                                                       | -6.430                                                     | 1.496                                                         | 0.000                                                                 | 1.496                                                                   | -0.100                                                                       |
| UE                           | 95                    | 23 : 01 : 11         | 3718                                                               | 9.93                                                        | -6.304                                                     | 1.442                                                         | 0.000                                                                 | 1.442                                                                   | -0.088                                                                       |
|                              | 96                    | 02 : 11 : 15         | 3908                                                               | 7.01                                                        | -6.585                                                     | 1.371                                                         | 0.000                                                                 | 1.371                                                                   | -0.116                                                                       |
|                              | 96                    | 05 : 21 : 16         | 4098                                                               | 5.00                                                        | -6.366                                                     | 1.300                                                         | 0.000                                                                 | 1.300                                                                   | -0.117                                                                       |
|                              | 96                    | 06 : 17 : 57         | 4155                                                               | 4.44                                                        | -6.362                                                     | 1.279                                                         | 0.000                                                                 | 1.279                                                                   | -0.119                                                                       |
|                              | 96                    | 06 : 21 : 17         | 4158                                                               | 4.59                                                        | -6.172                                                     | 1.278                                                         | 0.000                                                                 | 1.278                                                                   | -0.076                                                                       |
|                              | 96                    | 07 : 51 : 17         | 4248                                                               | 11.06                                                       | 1.503                                                      | 1.300                                                         | 0.000                                                                 | 1.300                                                                   | 0.077                                                                        |
|                              | 96                    | 09 : 21 : 18         | 4338                                                               | 16.80                                                       | 6.940                                                      | 1.348                                                         | 0.000                                                                 | 1.348                                                                   | 0.166                                                                        |
|                              | 96                    | 10 : 51 : 19         | 4428                                                               | 23.09                                                       | 9.530                                                      | 1.404                                                         | 0.000                                                                 | 1.404                                                                   | 0.194                                                                        |
| US                           | 96                    | 12 : 21 : 20         | 4518                                                               | 29.51                                                       | 11.402                                                     | 1.460                                                         | 0.000                                                                 | 1.460                                                                   | 0.192                                                                        |
|                              | 96                    | 13 : 51 : 22         | 4608                                                               | 36.26                                                       | 12.261                                                     | 1.515                                                         | 0.000                                                                 | 1.515                                                                   | 0.191                                                                        |
|                              | 96                    | 15 : 21 : 23         | 4698                                                               | 43.56                                                       | 12.735                                                     | 1.570                                                         | 0.000                                                                 | 1.570                                                                   | 0.191                                                                        |
|                              | 96                    | 16 : 51 : 24         | 4788                                                               | 51.23                                                       | 12.673                                                     | 1.621                                                         | 0.000                                                                 | 1.621                                                                   | 0.180                                                                        |
|                              | 96                    | 18 : 21 : 26         | 4878                                                               | 59.39                                                       | 12.876                                                     | 1.671                                                         | 0.000                                                                 | 1.671                                                                   | 0.172                                                                        |
|                              | 96                    | 19 : 51 : 27         | 4968                                                               | 67.99                                                       | 13.334                                                     | 1.718                                                         | 0.000                                                                 | 1.718                                                                   | 0.164                                                                        |
|                              | 96                    | 21 : 21 : 28         | 5058                                                               | 76.62                                                       | 13.973                                                     | 1.769                                                         | 0.000                                                                 | 1.769                                                                   | 0.178                                                                        |
|                              | 96                    | 22 : 51 : 29         | 5148                                                               | 85.32                                                       | 14.936                                                     | 1.821                                                         | 0.000                                                                 | 1.821                                                                   | 0.179                                                                        |
|                              | 97                    | 00 : 21 : 31         | 5238                                                               | 93.45                                                       | 16.170                                                     | 1.874                                                         | 0.000                                                                 | 1.874                                                                   | 0.184                                                                        |
|                              | 97                    | 01 : 51 : 32         | 5328                                                               | 101.58                                                      | 17.402                                                     | 1.926                                                         | 0.000                                                                 | 1.926                                                                   | 0.180                                                                        |
|                              | 97                    | 04 : 21 : 34         | 5478                                                               | 109.39                                                      | 18.596                                                     | 1.980                                                         | 0.000                                                                 | 1.980                                                                   | 0.114                                                                        |
|                              | 97                    | 05 : 51 : 36         | 5568                                                               | 117.28                                                      | 20.240                                                     | 2.033                                                         | 0.000                                                                 | 2.033                                                                   | 0.184                                                                        |
|                              | 97                    | 07 : 21 : 37         | 5658                                                               | 124.87                                                      | 21.020                                                     | 2.085                                                         | 0.000                                                                 | 2.085                                                                   | 0.179                                                                        |
|                              | 97                    | 08 : 51 : 40         | 5748                                                               | 133.23                                                      | 22.735                                                     | 2.140                                                         | 0.000                                                                 | 2.140                                                                   | 0.191                                                                        |
|                              | 97                    | 10 : 21 : 42         | 5838                                                               | 141.42                                                      | 23.936                                                     | 2.194                                                         | 0.000                                                                 | 2.194                                                                   | 0.187                                                                        |
| UE                           | 97                    | 11 : 51 : 43         | 5928                                                               | 149.54                                                      | 24.489                                                     | 2.246                                                         | 0.000                                                                 | 2.246                                                                   | 0.181                                                                        |
|                              | 97                    | 13 : 21 : 45         | 6018                                                               | 157.90                                                      | 25.385                                                     | 2.299                                                         | 0.000                                                                 | 2.299                                                                   | 0.183                                                                        |
|                              | 97                    | 13 : 37 : 19         | 6034                                                               | 159.51                                                      | 25.149                                                     | 2.306                                                         | 0.000                                                                 | 2.306                                                                   | 0.143                                                                        |
|                              | 97                    | 13 : 41 : 45         | 6038                                                               | 158.63                                                      | 24.215                                                     | 2.307                                                         | 0.000                                                                 | 2.307                                                                   | 0.082                                                                        |
|                              | 97                    | 18 : 31 : 49         | 6328                                                               | 127.60                                                      | -2.666                                                     | 2.298                                                         | 0.000                                                                 | 2.298                                                                   | -0.010                                                                       |
|                              | 97                    | 23 : 21 : 54         | 6619                                                               | 104.58                                                      | -2.976                                                     | 2.264                                                         | 0.000                                                                 | 2.264                                                                   | -0.037                                                                       |
|                              | 98                    | 04 : 11 : 59         | 6909                                                               | 81.24                                                       | -4.925                                                     | 2.220                                                         | 0.000                                                                 | 2.220                                                                   | -0.048                                                                       |
| US                           | 98                    | 09 : 02 : 04         | 7199                                                               | 58.42                                                       | -7.671                                                     | 2.156                                                         | 0.000                                                                 | 2.156                                                                   | -0.068                                                                       |
|                              | 98                    | 13 : 52 : 08         | 7489                                                               | 42.40                                                       | -8.241                                                     | 2.090                                                         | 0.000                                                                 | 2.090                                                                   | -0.072                                                                       |
|                              | 98                    | 18 : 42 : 13         | 7779                                                               | 29.57                                                       | -8.918                                                     | 2.015                                                         | 0.000                                                                 | 2.015                                                                   | -0.080                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-12 ☒ Undisturbed or; ☐ Reconstituted - Specimen. File Name: B-2321\_UD11  
 Task No.: NA Date, Start: 4/1/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.0 Piston Uplift,  $P_{up}$  (lbf): 34.36  
 Project Name: Exelon (Victoria) Completed: 4/8/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5

4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Light Olive Gray Sandy Lean CLAY (CL)

Ring No.: 17 Area,  $A_r$  (cm<sup>2</sup>): 31.682 Solids Ht.,  $H_s$  (mm): 13.326 Specific Gravity,  $G_s =$  2.670 ☒ Meas.; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.22 Water 14.7 Void 0.442 Deg. of 88.9 Total Unit 132.4 Dry Unit 115.4  
**Final:** (mm):  $H_f$ : 17.79 Content,  $w$  (%): 12.9 Ratio,  $e$ : 0.335 Sat.,  $S$  (%): 102.6 Weight,  $\gamma_t$  (pcf): 140.7 Weight,  $\gamma_d$  (pcf): 124.6

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *HP*

| Loading Info. (1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                                                                    |                                                         |                               |                                          | Steady State Ratio, $SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $C_\alpha = \Delta d_{a,sc} / H_o$ ( $\times 10^{-4}$ ) |
|-------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                   |                                                        |                                                          |                                                                                                        |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf)                                        | Coefficient of Consolidation, $C_v$ (m <sup>2</sup> /y) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                      |
| S                 |                                                        |                                                          |                                                                                                        |                           | 0.26                                        |                                                    |                                                                          |                                           | Data on given line represents average conditions between that line and the previous line of data. |                                                         |                               |                                          |                                                                                       |                                                                                      |
| BS                |                                                        |                                                          | 0.21                                                                                                   | 0.439                     | 0.79                                        |                                                    |                                                                          | 19.176                                    |                                                                                                   |                                                         |                               |                                          |                                                                                       |                                                                                      |
| BE                |                                                        | 1.39                                                     | 0.16                                                                                                   | 0.440                     | 1.39                                        | -0.001                                             | -0.1                                                                     | 19.185                                    |                                                                                                   |                                                         | 0.439                         |                                          |                                                                                       |                                                                                      |
| CS                | 0                                                      | 1.41                                                     | 0.16                                                                                                   | 0.440                     | 1.41                                        | 0.000                                              | 0.0                                                                      | 19.185                                    |                                                                                                   |                                                         | 0.440                         |                                          |                                                                                       |                                                                                      |
|                   | 38                                                     | 2.98                                                     | 0.53                                                                                                   | 0.434                     | 3.56                                        | 0.830                                              | 23.3                                                                     | 19.115                                    | 2.20                                                                                              |                                                         | 0.437                         |                                          |                                                                                       |                                                                                      |
|                   | 106                                                    | 4.06                                                     | 0.90                                                                                                   | 0.429                     | 4.82                                        | 1.101                                              | 22.8                                                                     | 19.043                                    | 3.52                                                                                              |                                                         | 0.432                         |                                          |                                                                                       |                                                                                      |
| US                | 216                                                    | 5.48                                                     | 1.38                                                                                                   | 0.422                     | 6.62                                        | 1.640                                              | 24.8                                                                     | 18.950                                    | 4.77                                                                                              |                                                         | 0.426                         |                                          |                                                                                       |                                                                                      |
|                   | 326                                                    | 7.22                                                     | 1.85                                                                                                   | 0.415                     | 8.82                                        | 2.277                                              | 25.8                                                                     | 18.861                                    | 6.35                                                                                              |                                                         | 0.419                         |                                          | 0.98                                                                                  |                                                                                      |
|                   | 436                                                    | 9.23                                                     | 2.31                                                                                                   | 0.409                     | 11.21                                       | 2.838                                              | 25.3                                                                     | 18.772                                    | 8.22                                                                                              | 0.69                                                    | 0.412                         | 3.28E-04                                 | 1.63                                                                                  |                                                                                      |
|                   | 546                                                    | 11.49                                                    | 2.77                                                                                                   | 0.402                     | 13.87                                       | 3.414                                              | 24.6                                                                     | 18.684                                    | 10.36                                                                                             | 0.62                                                    | 0.405                         | 2.65E-04                                 | 2.23                                                                                  |                                                                                      |
|                   | 656                                                    | 14.17                                                    | 3.23                                                                                                   | 0.395                     | 16.93                                       | 3.961                                              | 23.4                                                                     | 18.596                                    | 12.83                                                                                             | 0.60                                                    | 0.399                         | 2.22E-04                                 | 2.91                                                                                  |                                                                                      |
|                   | 766                                                    | 17.20                                                    | 3.68                                                                                                   | 0.389                     | 20.31                                       | 4.484                                              | 22.1                                                                     | 18.508                                    | 15.69                                                                                             | 0.58                                                    | 0.392                         | 1.90E-04                                 | 3.54                                                                                  |                                                                                      |
|                   | 876                                                    | 20.46                                                    | 4.14                                                                                                   | 0.382                     | 23.95                                       | 5.047                                              | 21.1                                                                     | 18.421                                    | 18.83                                                                                             | 0.55                                                    | 0.386                         | 1.65E-04                                 | 4.08                                                                                  |                                                                                      |
|                   | 986                                                    | 24.00                                                    | 4.57                                                                                                   | 0.376                     | 27.97                                       | 5.734                                              | 20.5                                                                     | 18.338                                    | 22.23                                                                                             | 0.54                                                    | 0.379                         | 1.37E-04                                 | 4.66                                                                                  |                                                                                      |
|                   | 1096                                                   | 27.78                                                    | 5.03                                                                                                   | 0.369                     | 32.29                                       | 6.526                                              | 20.2                                                                     | 18.249                                    | 25.89                                                                                             | 0.50                                                    | 0.373                         | 1.29E-04                                 | 5.05                                                                                  |                                                                                      |
|                   | 1206                                                   | 31.77                                                    | 5.49                                                                                                   | 0.363                     | 36.85                                       | 7.338                                              | 19.9                                                                     | 18.161                                    | 29.78                                                                                             | 0.47                                                    | 0.366                         | 1.11E-04                                 | 5.31                                                                                  |                                                                                      |
|                   | 1316                                                   | 35.97                                                    | 5.93                                                                                                   | 0.356                     | 41.71                                       | 8.310                                              | 19.9                                                                     | 18.076                                    | 33.87                                                                                             | 0.44                                                    | 0.360                         | 9.47E-05                                 | 5.59                                                                                  |                                                                                      |

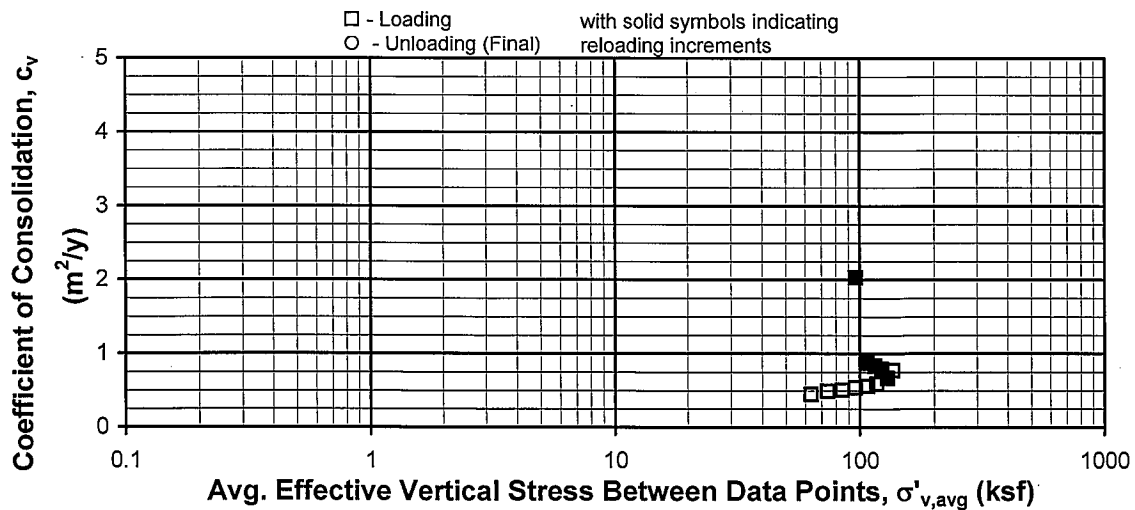
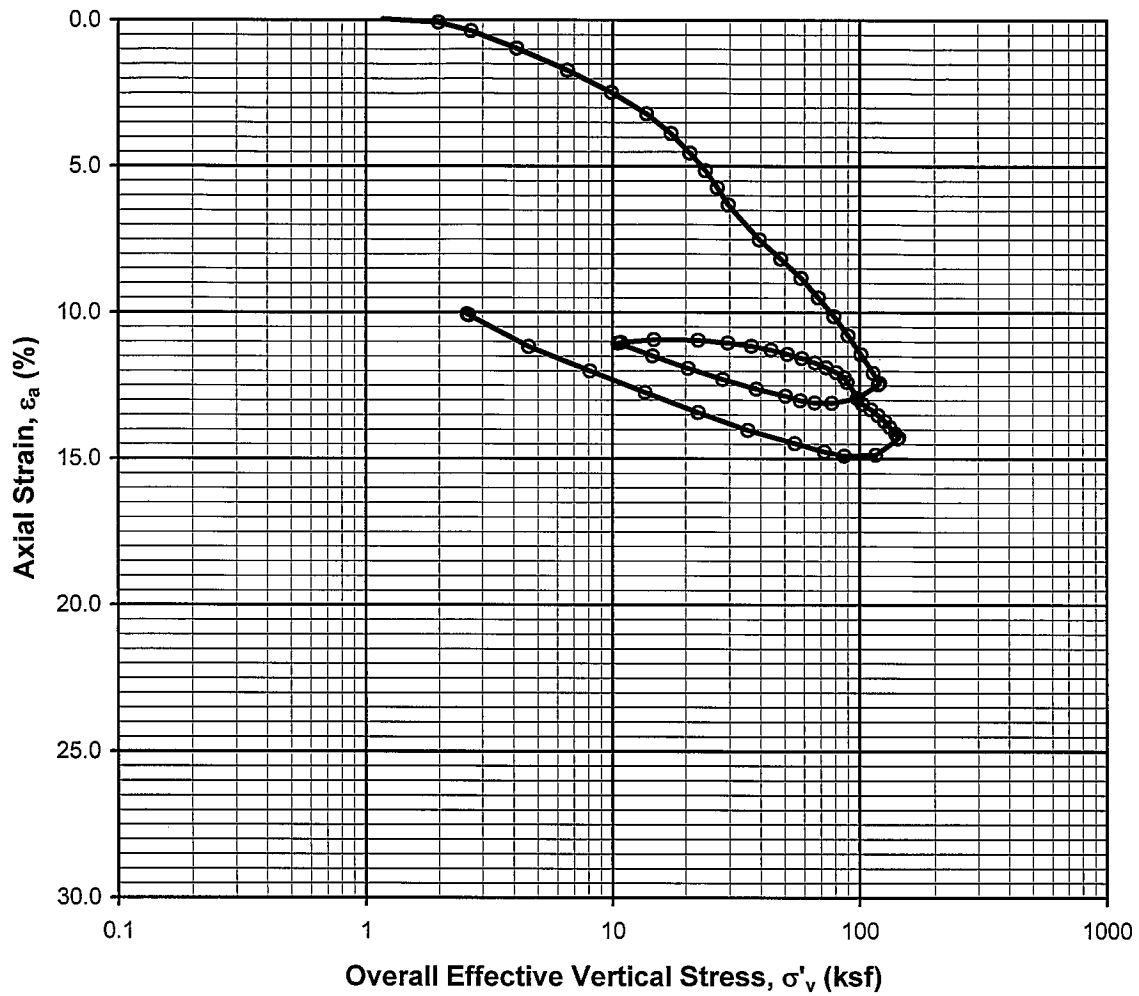
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_{\alpha} = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                    |
|                              | 1426                                                                     | 40.30                                                                   | 6.34                                                                                                                        | 0.351                              | 46.48                                                   | 8.957                                                          | 19.3                                                                                    | 17.997                                                | 38.13                                                                     | 0.39                                                                | 0.353                                  | 7.80E-05                                          | 5.46                                                                                           |                                                                                                    |
|                              | 1536                                                                     | 45.12                                                                   | 6.78                                                                                                                        | 0.344                              | 52.11                                                   | 10.127                                                         | 19.4                                                                                    | 17.913                                                | 42.71                                                                     | 0.41                                                                | 0.347                                  | 7.53E-05                                          | 6.38                                                                                           |                                                                                                    |
|                              | 1646                                                                     | 50.27                                                                   | 7.21                                                                                                                        | 0.338                              | 57.99                                                   | 11.185                                                         | 19.3                                                                                    | 17.830                                                | 47.69                                                                     | 0.38                                                                | 0.341                                  | 6.51E-05                                          | 6.46                                                                                           |                                                                                                    |
|                              | 1756                                                                     | 55.47                                                                   | 7.62                                                                                                                        | 0.332                              | 63.98                                                   | 12.339                                                         | 19.3                                                                                    | 17.752                                                | 52.87                                                                     | 0.35                                                                | 0.335                                  | 5.55E-05                                          | 6.43                                                                                           |                                                                                                    |
|                              | 1866                                                                     | 61.17                                                                   | 8.03                                                                                                                        | 0.326                              | 70.42                                                   | 13.417                                                         | 19.1                                                                                    | 17.673                                                | 58.32                                                                     | 0.34                                                                | 0.329                                  | 5.07E-05                                          | 6.76                                                                                           |                                                                                                    |
| UE                           | 1976                                                                     | 67.03                                                                   | 8.43                                                                                                                        | 0.320                              | 77.04                                                   | 14.514                                                         | 18.8                                                                                    | 17.596                                                | 64.10                                                                     | 0.32                                                                | 0.323                                  | 4.54E-05                                          | 6.84                                                                                           |                                                                                                    |
|                              | 2087                                                                     | 73.41                                                                   | 8.84                                                                                                                        | 0.315                              | 84.29                                                   | 15.773                                                         | 18.7                                                                                    | 17.518                                                | 70.22                                                                     |                                                                     | 0.317                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 2191                                                                     | 80.05                                                                   | 9.22                                                                                                                        | 0.309                              | 91.71                                                   | 16.926                                                         | 18.5                                                                                    | 17.445                                                | 76.73                                                                     |                                                                     | 0.312                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 2197                                                                     | 79.58                                                                   | 9.21                                                                                                                        | 0.309                              | 90.55                                                   | 15.946                                                         | 17.6                                                                                    | 17.446                                                | 79.82                                                                     |                                                                     | 0.309                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 2387                                                                     | 71.81                                                                   | 9.18                                                                                                                        | 0.310                              | 70.93                                                   | -1.332                                                         | -1.9                                                                                    | 17.451                                                | 75.70                                                                     |                                                                     | 0.309                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 2577                                                                     | 60.69                                                                   | 9.07                                                                                                                        | 0.311                              | 59.12                                                   | -2.373                                                         | -4.0                                                                                    | 17.474                                                | 66.25                                                                     |                                                                     | 0.310                                  |                                                   |                                                                                                |                                                                                                    |
| US                           | 2767                                                                     | 46.54                                                                   | 8.84                                                                                                                        | 0.315                              | 43.17                                                   | -5.155                                                         | -11.9                                                                                   | 17.518                                                | 53.62                                                                     |                                                                     | 0.313                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 2958                                                                     | 36.01                                                                   | 8.61                                                                                                                        | 0.318                              | 33.18                                                   | -4.334                                                         | -13.1                                                                                   | 17.562                                                | 41.28                                                                     | 0.95                                                                | 0.316                                  | 4.09E-05                                          | 2.25                                                                                           |                                                                                                    |
|                              | 3148                                                                     | 28.23                                                                   | 8.37                                                                                                                        | 0.321                              | 24.82                                                   | -5.292                                                         | -21.3                                                                                   | 17.608                                                | 32.12                                                                     | 0.81                                                                | 0.320                                  | 4.26E-05                                          | 3.79                                                                                           |                                                                                                    |
|                              | 3338                                                                     | 21.89                                                                   | 8.10                                                                                                                        | 0.325                              | 18.14                                                   | -5.902                                                         | -32.5                                                                                   | 17.660                                                | 25.06                                                                     | 0.58                                                                | 0.323                                  | 4.09E-05                                          | 4.07                                                                                           |                                                                                                    |
|                              | 3528                                                                     | 16.98                                                                   | 7.78                                                                                                                        | 0.330                              | 12.99                                                   | -6.430                                                         | -49.5                                                                                   | 17.720                                                | 19.44                                                                     | 0.43                                                                | 0.327                                  | 4.30E-05                                          | 4.01                                                                                           |                                                                                                    |
| UE                           | 3718                                                                     | 13.79                                                                   | 7.51                                                                                                                        | 0.334                              | 9.93                                                    | -6.304                                                         | -63.5                                                                                   | 17.774                                                | 15.38                                                                     | 0.26                                                                | 0.332                                  | 3.64E-05                                          | 3.04                                                                                           |                                                                                                    |
|                              | 3908                                                                     | 10.90                                                                   | 7.14                                                                                                                        | 0.339                              | 7.01                                                    | -6.585                                                         | -93.9                                                                                   | 17.845                                                | 12.34                                                                     |                                                                     | 0.336                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4098                                                                     | 8.65                                                                    | 6.77                                                                                                                        | 0.344                              | 5.00                                                    | -6.366                                                         | -127.2                                                                                  | 17.916                                                | 9.77                                                                      |                                                                     | 0.342                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4155                                                                     | 8.04                                                                    | 6.65                                                                                                                        | 0.346                              | 4.44                                                    | -6.362                                                         | -143.1                                                                                  | 17.937                                                | 8.34                                                                      |                                                                     | 0.345                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4158                                                                     | 8.10                                                                    | 6.65                                                                                                                        | 0.346                              | 4.59                                                    | -6.172                                                         | -134.4                                                                                  | 17.938                                                | 8.07                                                                      |                                                                     | 0.346                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4248                                                                     | 10.03                                                                   | 6.77                                                                                                                        | 0.344                              | 11.06                                                   | 1.503                                                          | 13.6                                                                                    | 17.916                                                | 9.07                                                                      |                                                                     | 0.345                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4338                                                                     | 11.78                                                                   | 7.02                                                                                                                        | 0.341                              | 16.80                                                   | 6.940                                                          | 41.3                                                                                    | 17.868                                                | 10.91                                                                     |                                                                     | 0.343                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4428                                                                     | 16.19                                                                   | 7.31                                                                                                                        | 0.337                              | 23.09                                                   | 9.530                                                          | 41.3                                                                                    | 17.812                                                | 13.99                                                                     |                                                                     | 0.339                                  |                                                   |                                                                                                |                                                                                                    |
| US                           | 4518                                                                     | 21.31                                                                   | 7.60                                                                                                                        | 0.332                              | 29.51                                                   | 11.402                                                         | 38.6                                                                                    | 17.756                                                | 18.75                                                                     |                                                                     | 0.335                                  |                                                   |                                                                                                |                                                                                                    |
|                              | 4608                                                                     | 27.54                                                                   | 7.88                                                                                                                        | 0.328                              | 36.26                                                   | 12.261                                                         | 33.8                                                                                    | 17.701                                                | 24.43                                                                     |                                                                     | 0.330                                  |                                                   | 0.46                                                                                           |                                                                                                    |
|                              | 4698                                                                     | 34.59                                                                   | 8.17                                                                                                                        | 0.324                              | 43.56                                                   | 12.735                                                         | 29.2                                                                                    | 17.646                                                | 31.07                                                                     |                                                                     | 0.326                                  |                                                   | 0.98                                                                                           |                                                                                                    |
|                              | 4788                                                                     | 42.39                                                                   | 8.44                                                                                                                        | 0.320                              | 51.23                                                   | 12.673                                                         | 24.7                                                                                    | 17.595                                                | 38.49                                                                     | 0.47                                                                | 0.322                                  | 4.16E-05                                          | 1.56                                                                                           |                                                                                                    |
|                              | 4878                                                                     | 50.46                                                                   | 8.70                                                                                                                        | 0.317                              | 59.39                                                   | 12.876                                                         | 21.7                                                                                    | 17.545                                                | 46.43                                                                     | 0.51                                                                | 0.318                                  | 3.91E-05                                          | 2.25                                                                                           |                                                                                                    |
|                              | 4968                                                                     | 58.78                                                                   | 8.94                                                                                                                        | 0.313                              | 67.99                                                   | 13.334                                                         | 19.6                                                                                    | 17.498                                                | 54.62                                                                     | 0.53                                                                | 0.315                                  | 3.57E-05                                          | 2.93                                                                                           |                                                                                                    |

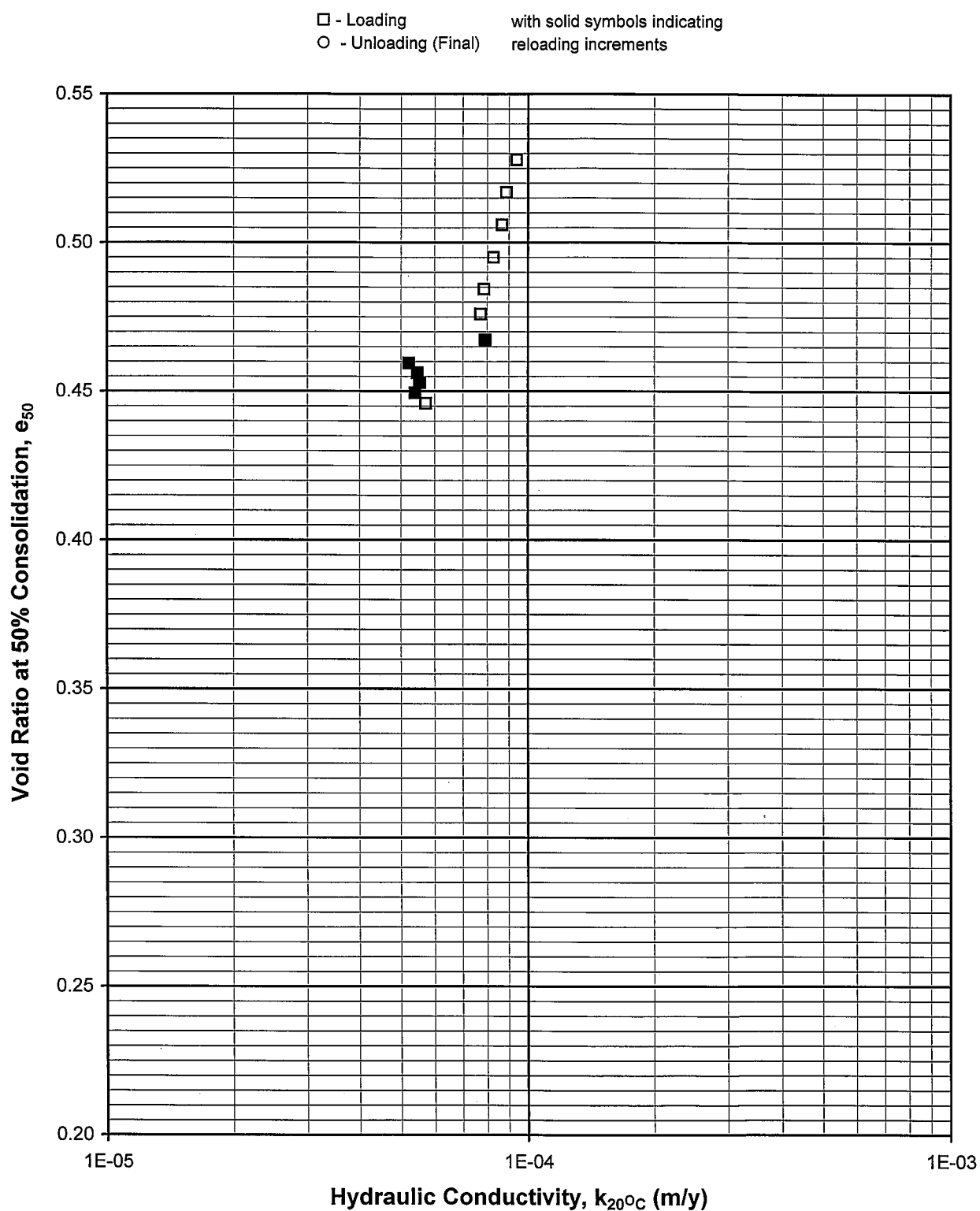
### ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

[illegible]





**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-15A - Depth 130.5 - 132.5 ft  
 Boring B-2321UD



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-15A - Depth 130.5 - 132.5 ft  
 Boring B-2321UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD15a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Meas. ; ☐ Assumed Ring No.: 3  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.723  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                        |                                   |                                  |                  |                         |
|----------------------------------------------------|-------------------------------------------|----------------------------------------|-----------------------------------|----------------------------------|------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner         | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2321UD                               | <input type="checkbox"/> LPC Core         | <input type="checkbox"/> Impact/Rammer |                                   | Rammer Wgt. (lb) =               | No. Layers =     |                         |
| Sample No.: UD-15                                  | Compostite No.:                           | Pluviated:                             |                                   | Tamper Force (lb) =              | Drop (in.) =     |                         |
| Depth (ft): 130.5 - 132.5                          | Specimen No.: A                           | Kneading                               |                                   | Undercompaction: $U_{ni}$ (%) =  | Dia. (in.) =     |                         |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                        |                                   | Ref. Effort =                    | % Comp. =        | $\pm$ Opt. =            |

| Water Content (W);                                       | Initial - Trimming Location |                  |                                             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------------------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)      | Sides (W3)                                  |                                | Mass Moist Soil + Ring (g)                           | 331.13  | 334.48 |
| Container No.                                            | 148                         | 829              | 2024                                        | 777                            | Mass Ring (g)                                        | 211.72  |        |
| Mass Moist Soil + Container (g)                          | 126.71                      | 137.08           | 99.57                                       | 69.07                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 119.41  | 122.76 |
| Mass Dry Soil + Container (g)                            | 109.99                      | 118.13           | 88.08                                       | 61.13                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 30.03                       | 32.30            | 30.51                                       | 31.78                          | Container No.                                        | 1156    |        |
| WATER CONTENT (%)                                        | 20.91                       | 22.08            | 19.96                                       | 27.05                          | Mass Dry Soil + Container (g)                        | 33.00   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 20.98                       | Final $W_{at}$ : | <input checked="" type="checkbox"/> Slice ; | Whole Spec.                    | Mass Container (g)                                   | 32.26   |        |
| See attached data sheet(s) for additional water contents |                             |                  |                                             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.74    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.070 |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.050                                                                                                                                                                       | 0.000                                  | 13.350                                    | 13.110                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.012                                                              | 13.346 |
| 19.030                                                                                                                                                                       | 0.000                                  | 13.180                                    | 13.190                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.114 |
| 18.990                                                                                                                                                                       | 0.000                                  | 13.310                                    | 13.110                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.012                                                              | 19.302 |
| 19.020                                                                                                                                                                       | 0.000                                  | 13.520                                    | 13.110                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 18.970                                                                                                                                                                       | 0.000                                  | 13.370                                    | 13.050                      | Initial Height, $H_o$                                   |  | 19.012                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{e,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{e,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             |                                                         |  | Final Soil Height Measurement, $H_{f,m}$                            |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             |                                                         |  | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               |        |

| Estimated Initial Unit Weight                                                                         |        | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                                         | 123.60 | Container No.                                           |      |
| Dry, $\gamma_{d,o}$ (pcf) =                                                                           | 102.16 | Mass Dry Soil + Cont. (g)                               | NA   |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |        | Mass Cont. (g)                                          | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |        | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |        |                                                         |      |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Pale Yellow Fat CLAY with sand (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/25/2008 Date: 3/25/2008 Final Calc. By: LF Date: 3/28/2008  
 Reviewed By: HP *HP*

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD15a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 20.91                    | 98.76                    | 86.9                         | 97.2                  | 98.9  |
| 2                | " Bottom, W2          | 22.08                    | 97.81                    | 89.6                         | 99.7                  | 101.4 |
| 3                | " Sides, W3           | 19.96                    | 99.54                    | 84.6                         | 95.2                  | 96.9  |
| 4                | " Average, W4         | 20.98                    | 98.70                    | 87.1                         | 97.4                  | 99.1  |
| 5                | " Back Calculated (1) | 22.65                    | 97.36 (3)                | 90.8                         | 100.8                 | 102.5 |
| 6                | Final                 | 27.05                    | 97.36 (2)                | 90.8                         | 100.8                 | 102.5 |

|                                                                                                                                                                    |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                                                                                    |  |
| Used Cal. Routine No. 5 to obtain the mass of dry soil and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |
| Back Cal. $G_s$ = 2.725                                                                                                                                            |  |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.718                                                                                                            |  |

|                                                                              |         |
|------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times p_w \times A_r$ |         |
| Estimated, $K_s$                                                             | 0.11653 |
| Final Selected, $K_r$                                                        | 0.11653 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 97.68                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 97.52                                                 |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                                  |                                                                        |          |  |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|----------|--|
| Specific Gravity<br>G <sub>s</sub> = 2.710 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                                  |                                                                        |          |  |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                                  |                                                                        |          |  |
| Mass Dry Soil, (g)                         | Initial: 97.36       |               | X                           | From Cal. Routine No. 5                 |                                                                                          | Note: Routine #5 is based on final measurements. |                                                                        |          |  |
|                                            | Final (4): NA        |               |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          | Avg. of measured & make S <sub>f</sub> = 100%    |                                                                        |          |  |
| Initial Height (mm) = 19.01                |                      |               |                             | X                                       | Measured ;                                                                               |                                                  | Back Calculated Back-cal. Sat. (%) = NA                                |          |  |
| Final Height (mm) = 19.30                  |                      |               |                             | X                                       | Measured ;                                                                               |                                                  | Initial H <sub>o</sub> & dial change during loading                    |          |  |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm)      | Extruded soil loss proportioned in increasing loading increments (5) : |          |  |
| Initial                                    | 22.6                 | 0.676         | 90.8                        | 123.6                                   | 100.8                                                                                    | 11.345                                           | From                                                                   | To (ksf) |  |
| Final                                      | 26.1                 | 0.701         | 100.8                       | 125.2                                   | 99.3                                                                                     | NA                                               | NA                                                                     | NA       |  |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 61 | Minus 200 (%) |
| Casagrande Method      | 13.10             | NA                                | 0.120 | 0.020 | 1.1 | Plastic Limit (PL)    | 17 | 77.0          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 44 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP 

Date: 3/31/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321\_UD15a  
 Task No.: NA Date: Start: 3/25/2008 Initial Height,  $H_o$  (mm): 19.01  
 Project Name: Exelon (Victoria) Completed: 3/28/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7233  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b,BE}$  (psi): 70.60013 ,V: 0.02310008 Piston Uplift,  $P_{up}$  (lb): 34.68  
 Back Pressure,  $U_{b,CS}$  (psi): 70.59707 ,V: 0.02309907 Setup  $DT_{ref}$  (V): 0.04994261  
 Displacement Transducer No.: DT-103 Calib. Factor (mm/V): -213.848 Ch. No.: 7  
 Pore Press. Transducer No.: PT-108 Calib. Factor (psi/V): 3029.501 Ref. Zero (V): -0.000204 Ch. No.: 8  
 Force Cell No.: FT-103 Calib. Factor (lb/V): 161103.256 Ref. Zero (V): 0.000104 Ch. No.: 9

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 85                    | 16 : 00 : 00         |                                                                    | 0.41                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 85                    | 16 : 12 : 00         |                                                                    | 0.89                                                        |                                                            | 0.033                                                         | 0.018                                                                 | 0.015                                                                   |                                                                              |
| BE                           | 86                    | 09 : 28 : 00         |                                                                    | 1.17                                                        | 0.000                                                      | 0.019                                                         | 0.027                                                                 | -0.008                                                                  |                                                                              |
| CS                           | 86                    | 09 : 29 : 00         | 0                                                                  | 1.18                                                        | 0.000                                                      | 0.019                                                         | 0.027                                                                 | -0.008                                                                  |                                                                              |
|                              | 86                    | 09 : 43 : 00         | 14                                                                 | 1.98                                                        | 0.000                                                      | 0.062                                                         | 0.047                                                                 | 0.015                                                                   | 0.529                                                                        |
|                              | 86                    | 09 : 57 : 00         | 28                                                                 | 2.70                                                        | 0.000                                                      | 0.131                                                         | 0.060                                                                 | 0.071                                                                   | 1.260                                                                        |
|                              | 86                    | 10 : 18 : 00         | 49                                                                 | 4.11                                                        | 0.003                                                      | 0.262                                                         | 0.079                                                                 | 0.182                                                                   | 1.672                                                                        |
|                              | 86                    | 10 : 46 : 00         | 77                                                                 | 6.60                                                        | 0.012                                                      | 0.431                                                         | 0.103                                                                 | 0.327                                                                   | 1.634                                                                        |
|                              | 86                    | 11 : 14 : 00         | 105                                                                | 9.98                                                        | 0.121                                                      | 0.598                                                         | 0.127                                                                 | 0.470                                                                   | 1.614                                                                        |
|                              | 86                    | 11 : 42 : 00         | 133                                                                | 14.44                                                       | 0.944                                                      | 0.760                                                         | 0.152                                                                 | 0.608                                                                   | 1.552                                                                        |
|                              | 86                    | 12 : 10 : 00         | 161                                                                | 20.10                                                       | 3.884                                                      | 0.916                                                         | 0.177                                                                 | 0.738                                                                   | 1.467                                                                        |
| US                           | 86                    | 12 : 38 : 00         | 189                                                                | 26.96                                                       | 8.752                                                      | 1.068                                                         | 0.204                                                                 | 0.864                                                                   | 1.415                                                                        |
|                              | 86                    | 13 : 06 : 00         | 217                                                                | 35.15                                                       | 15.306                                                     | 1.211                                                         | 0.232                                                                 | 0.979                                                                   | 1.301                                                                        |
|                              | 86                    | 13 : 34 : 00         | 245                                                                | 43.32                                                       | 22.223                                                     | 1.347                                                         | 0.257                                                                 | 1.090                                                                   | 1.245                                                                        |
|                              | 86                    | 14 : 02 : 00         | 273                                                                | 53.22                                                       | 31.117                                                     | 1.485                                                         | 0.285                                                                 | 1.200                                                                   | 1.246                                                                        |
|                              | 86                    | 14 : 58 : 00         | 329                                                                | 73.52                                                       | 44.653                                                     | 1.764                                                         | 0.336                                                                 | 1.428                                                                   | 1.283                                                                        |
|                              | 86                    | 15 : 26 : 00         | 357                                                                | 82.69                                                       | 45.924                                                     | 1.908                                                         | 0.357                                                                 | 1.552                                                                   | 1.395                                                                        |
|                              | 86                    | 15 : 54 : 00         | 385                                                                | 91.88                                                       | 45.661                                                     | 2.055                                                         | 0.377                                                                 | 1.678                                                                   | 1.422                                                                        |
|                              | 86                    | 16 : 22 : 00         | 413                                                                | 101.75                                                      | 45.765                                                     | 2.202                                                         | 0.397                                                                 | 1.804                                                                   | 1.421                                                                        |
|                              | 86                    | 16 : 50 : 00         | 441                                                                | 112.40                                                      | 46.023                                                     | 2.346                                                         | 0.419                                                                 | 1.927                                                                   | 1.391                                                                        |
|                              | 86                    | 17 : 18 : 00         | 469                                                                | 123.29                                                      | 46.055                                                     | 2.492                                                         | 0.440                                                                 | 2.052                                                                   | 1.403                                                                        |
|                              | 86                    | 17 : 46 : 00         | 497                                                                | 134.73                                                      | 46.451                                                     | 2.635                                                         | 0.461                                                                 | 2.174                                                                   | 1.379                                                                        |
|                              | 86                    | 18 : 14 : 00         | 525                                                                | 146.66                                                      | 46.499                                                     | 2.776                                                         | 0.482                                                                 | 2.294                                                                   | 1.348                                                                        |
| UE                           | 86                    | 18 : 30 : 00         | 541                                                                | 153.83                                                      | 46.743                                                     | 2.857                                                         | 0.495                                                                 | 2.362                                                                   | 1.349                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 86                    | 18 : 32 : 00         | 543                                                                | 152.39                                                      | 46.788                                                     | 2.862                                                         | 0.493                                                                 | 2.369                                                                   | 1.080                                                                        |
|                              | 86                    | 19 : 22 : 00         | 593                                                                | 133.14                                                      | 48.402                                                     | 2.921                                                         | 0.462                                                                 | 2.459                                                                   | 0.569                                                                        |
|                              | 86                    | 20 : 12 : 00         | 643                                                                | 108.85                                                      | 43.501                                                     | 2.911                                                         | 0.420                                                                 | 2.491                                                                   | 0.199                                                                        |
|                              | 86                    | 21 : 02 : 00         | 693                                                                | 84.84                                                       | 26.471                                                     | 2.864                                                         | 0.376                                                                 | 2.488                                                                   | -0.018                                                                       |
|                              | 86                    | 21 : 52 : 00         | 743                                                                | 63.23                                                       | 7.886                                                      | 2.805                                                         | 0.332                                                                 | 2.473                                                                   | -0.096                                                                       |
|                              | 86                    | 22 : 42 : 00         | 793                                                                | 45.16                                                       | -7.992                                                     | 2.736                                                         | 0.291                                                                 | 2.445                                                                   | -0.175                                                                       |
|                              | 86                    | 23 : 32 : 00         | 843                                                                | 31.21                                                       | -11.337                                                    | 2.654                                                         | 0.255                                                                 | 2.398                                                                   | -0.295                                                                       |
|                              | 87                    | 00 : 22 : 00         | 893                                                                | 21.07                                                       | -11.495                                                    | 2.562                                                         | 0.225                                                                 | 2.337                                                                   | -0.390                                                                       |
| US                           | 87                    | 01 : 12 : 00         | 943                                                                | 13.61                                                       | -11.519                                                    | 2.464                                                         | 0.199                                                                 | 2.265                                                                   | -0.453                                                                       |
|                              | 87                    | 02 : 02 : 00         | 993                                                                | 8.15                                                        | -11.453                                                    | 2.359                                                         | 0.174                                                                 | 2.185                                                                   | -0.504                                                                       |
|                              | 87                    | 02 : 50 : 00         | 1041                                                               | 4.58                                                        | -11.437                                                    | 2.251                                                         | 0.151                                                                 | 2.101                                                                   | -0.553                                                                       |
|                              | 87                    | 02 : 52 : 00         | 1043                                                               | 4.82                                                        | -11.437                                                    | 2.250                                                         | 0.153                                                                 | 2.097                                                                   | -0.576                                                                       |
| UE                           | 87                    | 03 : 04 : 00         | 1055                                                               | 8.35                                                        | -11.418                                                    | 2.254                                                         | 0.175                                                                 | 2.078                                                                   | -0.488                                                                       |
|                              | 87                    | 03 : 16 : 00         | 1067                                                               | 15.55                                                       | -11.368                                                    | 2.289                                                         | 0.206                                                                 | 2.083                                                                   | 0.111                                                                        |
|                              | 87                    | 03 : 28 : 00         | 1079                                                               | 22.55                                                       | -11.295                                                    | 2.329                                                         | 0.230                                                                 | 2.099                                                                   | 0.435                                                                        |
|                              | 87                    | 03 : 40 : 00         | 1091                                                               | 29.72                                                       | -11.198                                                    | 2.372                                                         | 0.251                                                                 | 2.121                                                                   | 0.561                                                                        |
|                              | 87                    | 03 : 52 : 00         | 1103                                                               | 37.02                                                       | -11.071                                                    | 2.415                                                         | 0.271                                                                 | 2.145                                                                   | 0.639                                                                        |
|                              | 87                    | 04 : 04 : 00         | 1115                                                               | 44.27                                                       | -10.904                                                    | 2.460                                                         | 0.289                                                                 | 2.171                                                                   | 0.692                                                                        |
| US                           | 87                    | 04 : 16 : 00         | 1127                                                               | 51.88                                                       | -10.675                                                    | 2.506                                                         | 0.307                                                                 | 2.199                                                                   | 0.738                                                                        |
|                              | 87                    | 04 : 28 : 00         | 1139                                                               | 59.56                                                       | -10.341                                                    | 2.553                                                         | 0.324                                                                 | 2.229                                                                   | 0.777                                                                        |
|                              | 87                    | 04 : 40 : 00         | 1151                                                               | 67.18                                                       | -9.811                                                     | 2.600                                                         | 0.340                                                                 | 2.260                                                                   | 0.818                                                                        |
|                              | 87                    | 04 : 52 : 00         | 1163                                                               | 74.96                                                       | -8.850                                                     | 2.648                                                         | 0.356                                                                 | 2.292                                                                   | 0.832                                                                        |
|                              | 87                    | 05 : 04 : 00         | 1175                                                               | 82.74                                                       | -6.540                                                     | 2.696                                                         | 0.372                                                                 | 2.324                                                                   | 0.855                                                                        |
|                              | 87                    | 05 : 16 : 00         | 1187                                                               | 90.82                                                       | 1.990                                                      | 2.742                                                         | 0.387                                                                 | 2.355                                                                   | 0.817                                                                        |
|                              | 87                    | 06 : 16 : 00         | 1247                                                               | 136.35                                                      | 46.654                                                     | 2.964                                                         | 0.467                                                                 | 2.497                                                                   | 0.747                                                                        |
|                              | 87                    | 06 : 28 : 00         | 1259                                                               | 144.72                                                      | 47.016                                                     | 3.013                                                         | 0.480                                                                 | 2.532                                                                   | 0.930                                                                        |
|                              | 87                    | 06 : 40 : 00         | 1271                                                               | 152.67                                                      | 47.290                                                     | 3.063                                                         | 0.493                                                                 | 2.570                                                                   | 0.990                                                                        |
|                              | 87                    | 06 : 52 : 00         | 1283                                                               | 160.20                                                      | 47.553                                                     | 3.115                                                         | 0.506                                                                 | 2.609                                                                   | 1.018                                                                        |
|                              | 87                    | 07 : 04 : 00         | 1295                                                               | 166.60                                                      | 47.708                                                     | 3.163                                                         | 0.516                                                                 | 2.647                                                                   | 1.004                                                                        |
|                              | 87                    | 07 : 16 : 00         | 1307                                                               | 173.97                                                      | 47.801                                                     | 3.216                                                         | 0.529                                                                 | 2.688                                                                   | 1.076                                                                        |
| UE                           | 87                    | 07 : 24 : 00         | 1315                                                               | 178.57                                                      | 48.010                                                     | 3.250                                                         | 0.536                                                                 | 2.714                                                                   | 1.033                                                                        |
|                              | 87                    | 07 : 26 : 00         | 1317                                                               | 177.40                                                      | 47.923                                                     | 3.255                                                         | 0.534                                                                 | 2.720                                                                   | 0.989                                                                        |
|                              | 87                    | 08 : 44 : 00         | 1395                                                               | 151.22                                                      | 49.013                                                     | 3.321                                                         | 0.494                                                                 | 2.826                                                                   | 0.429                                                                        |
|                              | 87                    | 10 : 02 : 00         | 1473                                                               | 109.89                                                      | 32.314                                                     | 3.258                                                         | 0.426                                                                 | 2.833                                                                   | 0.026                                                                        |
|                              | 87                    | 11 : 20 : 00         | 1551                                                               | 75.35                                                       | 4.415                                                      | 3.167                                                         | 0.361                                                                 | 2.806                                                                   | -0.108                                                                       |
|                              | 87                    | 12 : 38 : 00         | 1629                                                               | 47.78                                                       | -11.042                                                    | 3.053                                                         | 0.301                                                                 | 2.753                                                                   | -0.215                                                                       |
|                              | 87                    | 13 : 56 : 00         | 1707                                                               | 28.40                                                       | -11.373                                                    | 2.917                                                         | 0.251                                                                 | 2.666                                                                   | -0.351                                                                       |
| US                           | 87                    | 15 : 14 : 00         | 1785                                                               | 15.53                                                       | -11.446                                                    | 2.762                                                         | 0.210                                                                 | 2.552                                                                   | -0.460                                                                       |
|                              | 87                    | 16 : 32 : 00         | 1863                                                               | 7.27                                                        | -11.436                                                    | 2.595                                                         | 0.173                                                                 | 2.422                                                                   | -0.526                                                                       |
|                              | 87                    | 17 : 50 : 00         | 1941                                                               | 2.69                                                        | -11.414                                                    | 2.419                                                         | 0.136                                                                 | 2.283                                                                   | -0.564                                                                       |
|                              | 87                    | 19 : 08 : 00         | 2019                                                               | 0.67                                                        | -11.387                                                    | 2.228                                                         | 0.104                                                                 | 2.123                                                                   | -0.646                                                                       |
| UE                           | 87                    | 20 : 26 : 00         | 2097                                                               | 0.14                                                        | -11.401                                                    | 2.024                                                         | 0.104                                                                 | 1.920                                                                   | -0.825                                                                       |

### - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-3 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321\_UD1!  
 Task No.: NA Date, Start: 3/25/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.6 Piston Uplift,  $P_{up}$  (lbf): 34.68  
 Project Name: Exelon (Victoria) Completed: 3/28/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Pale Yellow Fat CLAY with sand (CH)

Ring No.: 3 Area,  $A_r$  (cm<sup>2</sup>): 31.723 Solids Ht.,  $H_s$  (mm): 11.345 Specific Gravity,  $G_s =$  2.710 ☒ Meas. ; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.01 Water 22.6 Void 0.676 Deg. of 90.8 Total Unit 123.6 Dry Unit 100.8  
**Final:** (mm):  $H_f$ : 19.30 Content,  $w$  (%): 26.1 Ratio,  $e$ : 0.701 Sat.,  $S$  (%): 100.8 Weight,  $\gamma_t$  (pcf): 125.2 Weight,  $\gamma_d$  (pcf): 99.3

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to errati
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                             |                                    | 0.41                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | 0.08                                                                                                                        | 0.674                              | 0.89                                                    |                                                                |                                                                                         | 18.997                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 1.17                                                                    | -0.04                                                                                                                       | 0.676                              | 1.17                                                    | 0.000                                                          | 0.0                                                                                     | 19.020                                                |                                                                           |                                                                     | 0.675                                  |                                                   |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 1.18                                                                    | -0.04                                                                                                                       | 0.676                              | 1.18                                                    | 0.000                                                          | 0.0                                                                                     | 19.020                                                |                                                                           |                                                                     | 0.676                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14                                                                       | 1.98                                                                    | 0.08                                                                                                                        | 0.674                              | 1.98                                                    | 0.000                                                          | 0.0                                                                                     | 18.997                                                | 1.58                                                                      |                                                                     | 0.675                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 28                                                                       | 2.70                                                                    | 0.37                                                                                                                        | 0.669                              | 2.70                                                    | 0.000                                                          | 0.0                                                                                     | 18.941                                                | 2.34                                                                      |                                                                     | 0.672                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 49                                                                       | 4.11                                                                    | 0.96                                                                                                                        | 0.660                              | 4.11                                                    | 0.003                                                          | 0.1                                                                                     | 18.830                                                | 3.40                                                                      |                                                                     | 0.665                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 77                                                                       | 6.59                                                                    | 1.72                                                                                                                        | 0.647                              | 6.60                                                    | 0.012                                                          | 0.2                                                                                     | 18.685                                                | 5.35                                                                      |                                                                     | 0.653                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 105                                                                      | 9.90                                                                    | 2.47                                                                                                                        | 0.634                              | 9.98                                                    | 0.121                                                          | 1.2                                                                                     | 18.542                                                | 8.24                                                                      |                                                                     | 0.641                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 133                                                                      | 13.80                                                                   | 3.20                                                                                                                        | 0.622                              | 14.44                                                   | 0.944                                                          | 6.5                                                                                     | 18.404                                                | 11.85                                                                     |                                                                     | 0.628                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 161                                                                      | 17.42                                                                   | 3.88                                                                                                                        | 0.611                              | 20.10                                                   | 3.884                                                          | 19.3                                                                                    | 18.274                                                | 15.61                                                                     |                                                                     | 0.616                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 189                                                                      | 20.76                                                                   | 4.54                                                                                                                        | 0.600                              | 26.96                                                   | 8.752                                                          | 32.5                                                                                    | 18.148                                                | 19.09                                                                     |                                                                     | 0.605                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 217                                                                      | 24.01                                                                   | 5.15                                                                                                                        | 0.589                              | 35.15                                                   | 15.306                                                         | 43.5                                                                                    | 18.033                                                | 22.38                                                                     |                                                                     | 0.595                                  |                                                   | 0.54                                                                                           |                                                                                                  |
|                              | 245                                                                      | 26.81                                                                   | 5.73                                                                                                                        | 0.580                              | 43.32                                                   | 22.223                                                         | 51.3                                                                                    | 17.922                                                | 25.41                                                                     |                                                                     | 0.585                                  |                                                   | 0.64                                                                                           |                                                                                                  |
|                              | 273                                                                      | 29.63                                                                   | 6.31                                                                                                                        | 0.570                              | 53.22                                                   | 31.117                                                         | 58.5                                                                                    | 17.812                                                | 28.22                                                                     |                                                                     | 0.575                                  |                                                   | 0.77                                                                                           |                                                                                                  |
|                              | 329                                                                      | 39.42                                                                   | 7.51                                                                                                                        | 0.550                              | 73.52                                                   | 44.653                                                         | 60.7                                                                                    | 17.584                                                | 34.52                                                                     |                                                                     | 0.560                                  |                                                   | 0.89                                                                                           |                                                                                                  |
|                              | 357                                                                      | 48.17                                                                   | 8.16                                                                                                                        | 0.539                              | 82.69                                                   | 45.924                                                         | 55.5                                                                                    | 17.460                                                | 43.79                                                                     |                                                                     | 0.544                                  |                                                   | 0.81                                                                                           |                                                                                                  |

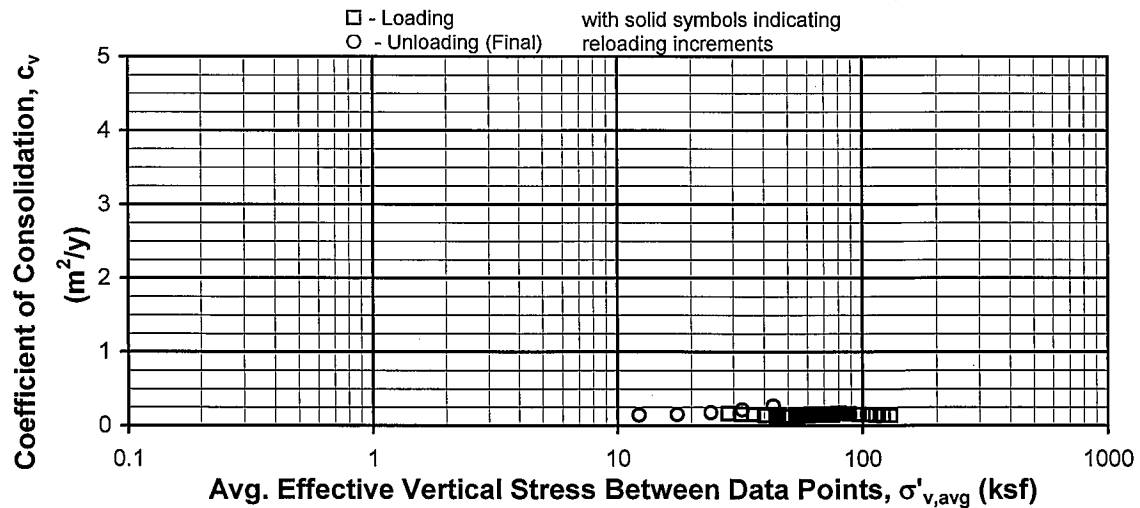
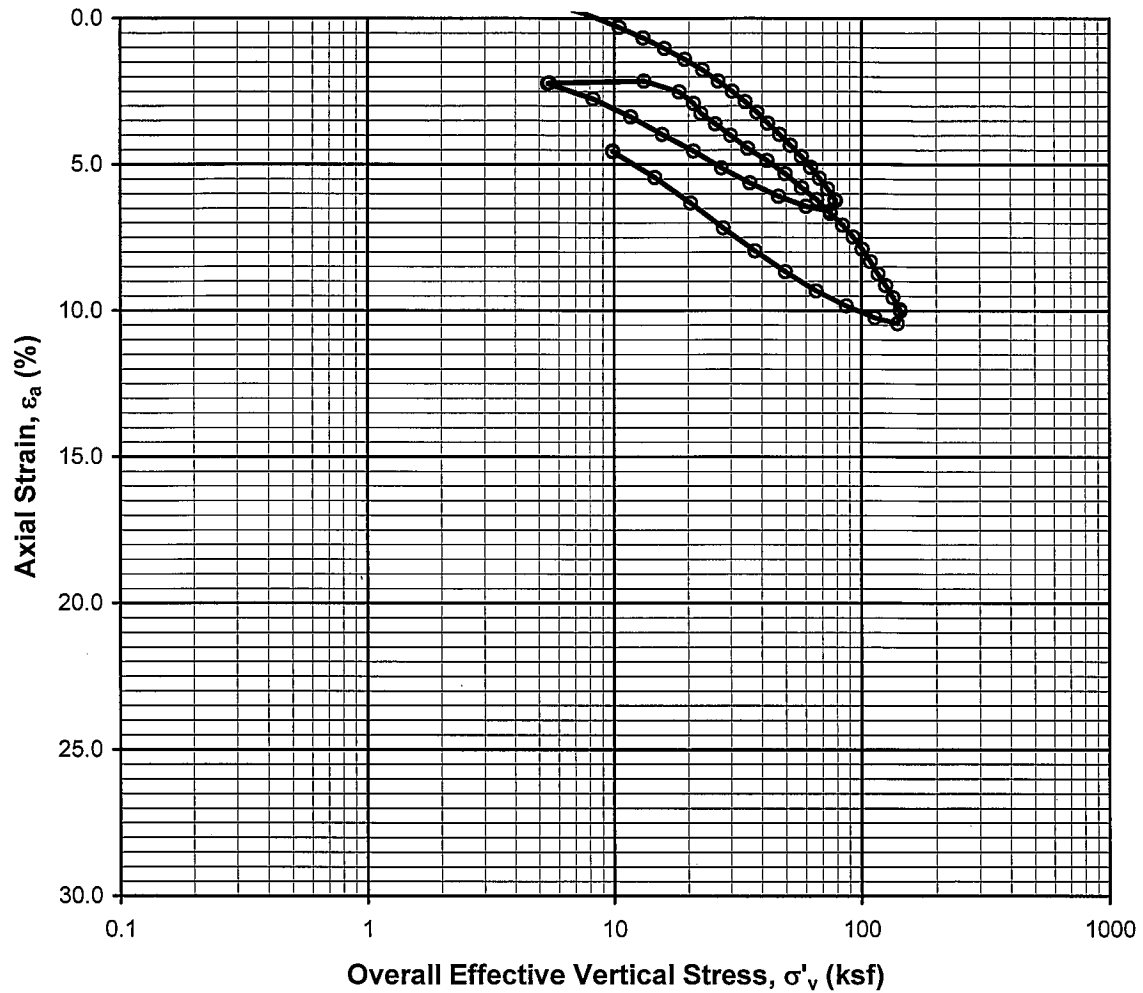


# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

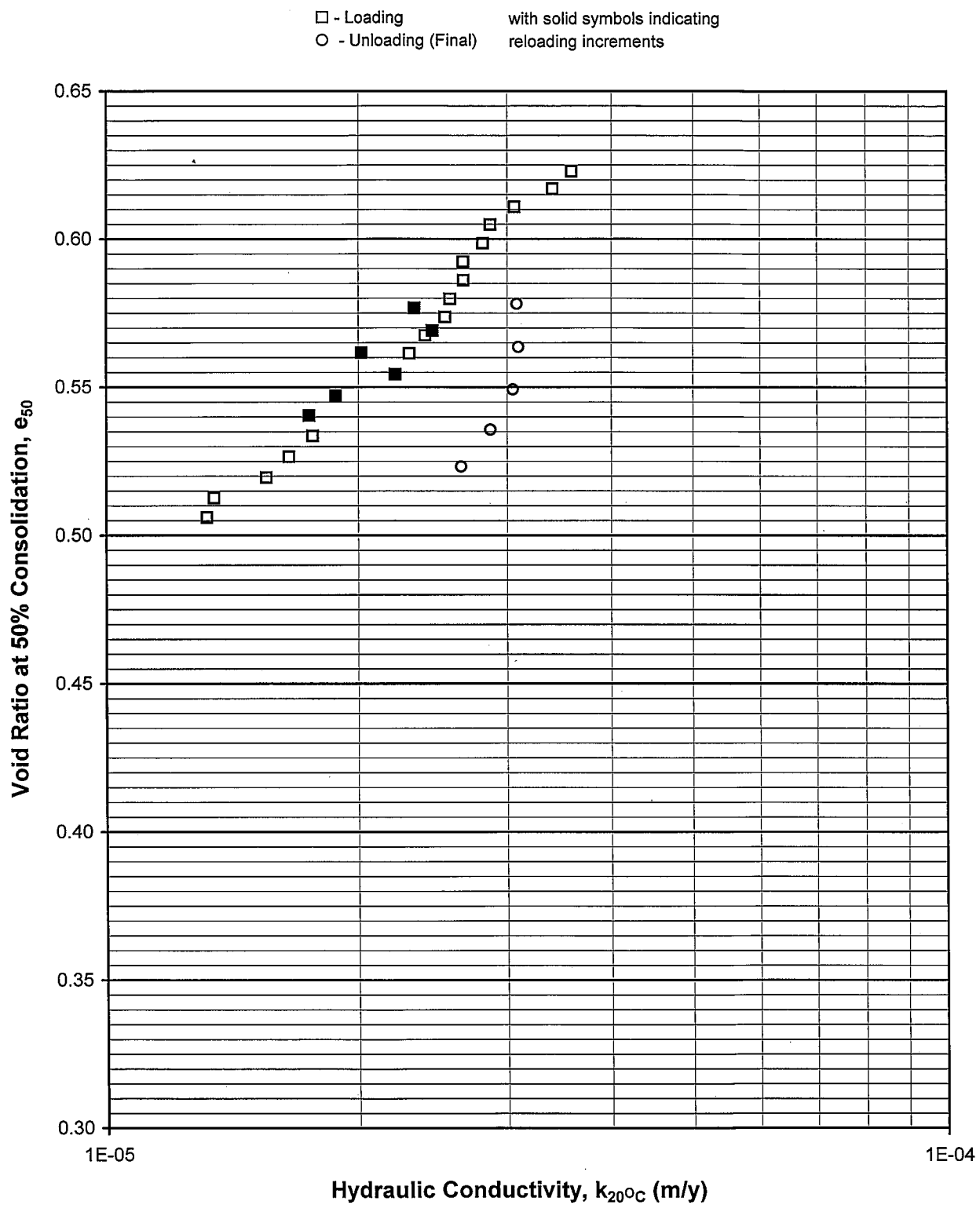
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha = \frac{\Delta d_{a,sc}}{H_o}$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                        |
|                              | 385                                                                      | 58.11                                                                   | 8.83                                                                                                                  | 0.528                              | 91.88                                                   | 45.661                                                         | 49.7                                                                                    | 17.334                                                | 53.14                                                                     |                                                             | 0.533                                  |                                                   | 0.99                                                                                           |                                                                                                        |
|                              | 413                                                                      | 68.32                                                                   | 9.49                                                                                                                  | 0.517                              | 101.75                                                  | 45.765                                                         | 45.0                                                                                    | 17.208                                                | 63.22                                                                     | 0.45                                                        | 0.522                                  | 9.39E-05                                          | 1.28                                                                                           |                                                                                                        |
|                              | 441                                                                      | 79.11                                                                   | 10.14                                                                                                                 | 0.506                              | 112.40                                                  | 46.023                                                         | 40.9                                                                                    | 17.085                                                | 73.71                                                                     | 0.49                                                        | 0.511                                  | 8.87E-05                                          | 1.60                                                                                           |                                                                                                        |
|                              | 469                                                                      | 90.27                                                                   | 10.79                                                                                                                 | 0.495                              | 123.29                                                  | 46.055                                                         | 37.4                                                                                    | 16.960                                                | 84.69                                                                     | 0.51                                                        | 0.500                                  | 8.67E-05                                          | 1.87                                                                                           |                                                                                                        |
|                              | 497                                                                      | 101.64                                                                  | 11.44                                                                                                                 | 0.484                              | 134.73                                                  | 46.451                                                         | 34.5                                                                                    | 16.838                                                | 95.95                                                                     | 0.54                                                        | 0.489                                  | 8.27E-05                                          | 2.20                                                                                           |                                                                                                        |
|                              | 525                                                                      | 113.74                                                                  | 12.07                                                                                                                 | 0.474                              | 146.66                                                  | 46.499                                                         | 31.7                                                                                    | 16.718                                                | 107.69                                                                    | 0.56                                                        | 0.479                                  | 7.86E-05                                          | 2.54                                                                                           |                                                                                                        |
| UE                           | 541                                                                      | 120.83                                                                  | 12.43                                                                                                                 | 0.468                              | 153.83                                                  | 46.743                                                         | 30.4                                                                                    | 16.650                                                | 117.28                                                                    | 0.59                                                        | 0.471                                  | 7.71E-05                                          | 2.83                                                                                           |                                                                                                        |
|                              | 543                                                                      | 119.34                                                                  | 12.46                                                                                                                 | 0.467                              | 152.39                                                  | 46.788                                                         | 30.7                                                                                    | 16.643                                                | 120.08                                                                    |                                                             | 0.467                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 593                                                                      | 98.51                                                                   | 12.94                                                                                                                 | 0.459                              | 133.14                                                  | 48.402                                                         | 36.4                                                                                    | 16.553                                                | 108.92                                                                    |                                                             | 0.463                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 643                                                                      | 77.46                                                                   | 13.10                                                                                                                 | 0.456                              | 108.85                                                  | 43.501                                                         | 40.0                                                                                    | 16.521                                                | 87.99                                                                     |                                                             | 0.458                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 693                                                                      | 66.12                                                                   | 13.09                                                                                                                 | 0.456                              | 84.84                                                   | 26.471                                                         | 31.2                                                                                    | 16.524                                                | 71.79                                                                     |                                                             | 0.456                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 743                                                                      | 57.86                                                                   | 13.01                                                                                                                 | 0.458                              | 63.23                                                   | 7.886                                                          | 12.5                                                                                    | 16.539                                                | 61.99                                                                     |                                                             | 0.457                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 793                                                                      | 50.35                                                                   | 12.86                                                                                                                 | 0.460                              | 45.16                                                   | -7.992                                                         | -17.7                                                                                   | 16.567                                                | 54.10                                                                     |                                                             | 0.459                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 843                                                                      | 38.37                                                                   | 12.62                                                                                                                 | 0.464                              | 31.21                                                   | -11.337                                                        | -36.3                                                                                   | 16.614                                                | 44.36                                                                     |                                                             | 0.462                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 893                                                                      | 28.17                                                                   | 12.29                                                                                                                 | 0.470                              | 21.07                                                   | -11.495                                                        | -54.5                                                                                   | 16.675                                                | 33.27                                                                     |                                                             | 0.467                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 943                                                                      | 20.48                                                                   | 11.91                                                                                                                 | 0.476                              | 13.61                                                   | -11.519                                                        | -84.7                                                                                   | 16.747                                                | 24.32                                                                     |                                                             | 0.473                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 993                                                                      | 14.64                                                                   | 11.49                                                                                                                 | 0.483                              | 8.15                                                    | -11.453                                                        | -140.4                                                                                  | 16.827                                                | 17.56                                                                     |                                                             | 0.480                                  |                                                   | 0.71                                                                                           |                                                                                                        |
|                              | 1041                                                                     | 10.55                                                                   | 11.05                                                                                                                 | 0.491                              | 4.58                                                    | -11.437                                                        | -249.7                                                                                  | 16.911                                                | 12.59                                                                     | 0.87                                                        | 0.487                                  | 1.09E-04                                          | 1.14                                                                                           |                                                                                                        |
|                              | 1043                                                                     | 10.84                                                                   | 11.03                                                                                                                 | 0.491                              | 4.82                                                    | -11.437                                                        | -237.4                                                                                  | 16.915                                                | 10.70                                                                     |                                                             | 0.491                                  |                                                   | -2.04                                                                                          |                                                                                                        |
| UE                           | 1055                                                                     | 14.83                                                                   | 10.93                                                                                                                 | 0.493                              | 8.35                                                    | -11.418                                                        | -136.8                                                                                  | 16.934                                                | 12.83                                                                     |                                                             | 0.492                                  |                                                   | -5.10                                                                                          |                                                                                                        |
|                              | 1067                                                                     | 22.42                                                                   | 10.95                                                                                                                 | 0.492                              | 15.55                                                   | -11.368                                                        | -73.1                                                                                   | 16.929                                                | 18.63                                                                     |                                                             | 0.492                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1079                                                                     | 29.56                                                                   | 11.04                                                                                                                 | 0.491                              | 22.55                                                   | -11.295                                                        | -50.1                                                                                   | 16.913                                                | 25.99                                                                     |                                                             | 0.491                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1091                                                                     | 36.78                                                                   | 11.15                                                                                                                 | 0.489                              | 29.72                                                   | -11.198                                                        | -37.7                                                                                   | 16.891                                                | 33.17                                                                     |                                                             | 0.490                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1103                                                                     | 44.08                                                                   | 11.28                                                                                                                 | 0.487                              | 37.02                                                   | -11.071                                                        | -29.9                                                                                   | 16.867                                                | 40.43                                                                     |                                                             | 0.488                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1115                                                                     | 51.27                                                                   | 11.42                                                                                                                 | 0.484                              | 44.27                                                   | -10.904                                                        | -24.6                                                                                   | 16.841                                                | 47.67                                                                     |                                                             | 0.486                                  |                                                   |                                                                                                |                                                                                                        |
| US                           | 1127                                                                     | 58.77                                                                   | 11.57                                                                                                                 | 0.482                              | 51.88                                                   | -10.675                                                        | -20.6                                                                                   | 16.813                                                | 55.02                                                                     |                                                             | 0.483                                  |                                                   |                                                                                                |                                                                                                        |
|                              | 1139                                                                     | 66.27                                                                   | 11.72                                                                                                                 | 0.479                              | 59.56                                                   | -10.341                                                        | -17.4                                                                                   | 16.783                                                | 62.52                                                                     |                                                             | 0.481                                  |                                                   | -0.80                                                                                          |                                                                                                        |
|                              | 1151                                                                     | 73.58                                                                   | 11.89                                                                                                                 | 0.477                              | 67.18                                                   | -9.811                                                         | -14.6                                                                                   | 16.752                                                | 69.92                                                                     |                                                             | 0.478                                  |                                                   | -1.63                                                                                          |                                                                                                        |
|                              | 1163                                                                     | 80.75                                                                   | 12.05                                                                                                                 | 0.474                              | 74.96                                                   | -8.850                                                         | -11.8                                                                                   | 16.720                                                | 77.16                                                                     |                                                             | 0.475                                  |                                                   | -2.66                                                                                          |                                                                                                        |
|                              | 1175                                                                     | 87.04                                                                   | 12.22                                                                                                                 | 0.471                              | 82.74                                                   | -6.540                                                         | -7.9                                                                                    | 16.688                                                | 83.90                                                                     |                                                             | 0.472                                  |                                                   | -4.24                                                                                          |                                                                                                        |

## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-4A - Depth 35.0 - 36.7 ft  
 Boring B-2359UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-4A - Depth 35.0 - 36.7 ft  
Boring B-2359UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2359\_UD4a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.730 ☒ Meas.; ☐ Assumed Ring No.: 10  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.644  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                          |                                           |                                |                                   |                                  |                                           |                         |
|------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort: | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                     | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =                        | No. Layers =            |
| Sample No.: UD-4                         | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =                       | Drop (in.) =            |
| Depth (ft): 35.0 - 36.7                  | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) =           | Dia. (in.) =            |
| Spec. Selection by X-ray;                | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                             | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                                       | Initial - Trimming Location |                                                              |             | Final, $W_{at}$<br>(see below) | Soil and Ring Masses                                 | Initial | Final  |
|----------------------------------------------------------|-----------------------------|--------------------------------------------------------------|-------------|--------------------------------|------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)                                                  | Sides (W3)  |                                | Mass Moist Soil + Ring (g)                           | 338.38  | 336.61 |
| Container No.                                            | 765                         | 1109                                                         | 5057        | 678                            | Mass Ring (g)                                        | 215.51  |        |
| Mass Moist Soil + Container (g)                          | 116.68                      | 124.90                                                       | 91.77       | 62.40                          | Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)         | 122.87  | 121.10 |
| Mass Dry Soil + Container (g)                            | 101.60                      | 108.30                                                       | 80.94       | 57.06                          | EXCESS DRY SOIL (soil not incl. in final mass above) |         |        |
| Mass Container (g)                                       | 31.77                       | 31.82                                                        | 30.55       | 32.03                          | Container No.                                        | 2009    |        |
| WATER CONTENT (%)                                        | 21.60                       | 21.71                                                        | 21.49       | 21.33                          | Mass Dry Soil + Container (g)                        | 30.98   |        |
| Avg. Initial Water Content, $W_4$ (%)                    | 21.60                       | Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ; | Whole Spec. |                                | Mass Container (g)                                   | 30.52   |        |
| See attached data sheet(s) for additional water contents |                             |                                                              |             |                                | Mass Excess Dry Soil, $M_{d,es}$ (g)                 | 0.46    |        |

| Soil Height: Measurements (mm)                                                                                                                                               |                                                                       |                                                                       |                                                                       | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                                                       | Final                                                                 |                                                                       | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 19.060 |
| with Spec.                                                                                                                                                                   | without Spec.                                                         | with Spec.                                                            | without Spec.                                                         | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 19.200                                                                                                                                                                       | 0.000                                                                 | 11.890                                                                | 12.770                                                                | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 19.176  | 11.874 |
| 19.170                                                                                                                                                                       | 0.000                                                                 | 11.770                                                                | 12.820                                                                | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 12.796 |
| 19.180                                                                                                                                                                       | 0.000                                                                 | 11.890                                                                | 12.780                                                                | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 19.176  | 18.138 |
| 19.130                                                                                                                                                                       | 0.000                                                                 | 11.960                                                                | 12.830                                                                | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 19.200                                                                                                                                                                       | 0.000                                                                 | 11.860                                                                | 12.780                                                                | Initial Height, $H_o$                                   |                                                                     | 19.176  |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ | 0.884   |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           | 18.292  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                                                       |                                                                       |                                                                       |                                                         | Final Soil Height Measurement, $H_{f,m}$                            | 18.138  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                                                       |                                                                       |                                                                       |                                                         | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               | 0.80    |        |

| Estimated Initial Unit Weight                                                                         |                                    | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 126.41                                                                  | Dry, $\gamma_{d,o}$ (pcf) = 103.96 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |                                    | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Gray Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/7/2008 Date: 4/7/2008 Final Calc. By: DH Date: 4/17/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/15/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2359\_UD4a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.730 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |      |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial |
| 1                | Initial, Top, W1      | 21.60                    | 101.05                   | 92.6                         | 98.9                  | 96.6 |
| 2                | " Bottom, W2          | 21.71                    | 100.96                   | 92.9                         | 99.2                  | 96.9 |
| 3                | " Sides, W3           | 21.49                    | 101.13                   | 92.4                         | 98.6                  | 96.3 |
| 4                | " Average, W4         | 21.60                    | 101.05                   | 92.6                         | 98.9                  | 96.6 |
| 5                | " Back Calculated (1) | 22.54                    | 100.27 (3)               | 94.8                         | 101.3                 | 99.0 |
| 6                | Final                 | 21.33                    | 100.27 (2)               | 94.8                         | 101.3                 | 99.0 |

|                                                                 |                                                                                                                                            |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b> |                                                                                                                                            |
| Used Cal. Routine No. 5                                         | to obtain the mass of dry soil and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |
| Back Cal. $G_s$ = 2.750                                         |                                                                                                                                            |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.740         |                                                                                                                                            |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_s$                                                                | 0.11597 |
| Final Selected, $K_f$                                                           | 0.11597 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 100.69                                                                       |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 100.48                                                |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                             |                                                                        |                                                     |                         |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------|-------------------------|
| Specific Gravity<br>G <sub>s</sub> = 2.730 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                             |                                                                        |                                                     |                         |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                             |                                                                        |                                                     |                         |
| Mass Dry Soil, (g)                         | Initial:             | 100.27        | X                           | From Cal. Routine No.                   |                                                                                          | 5                                           | Note: Routine #5 is based on final measurements.                       |                                                     |                         |
|                                            | Final (4):           | NA            |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          |                                             | Avg. of measured & make S <sub>f</sub> = 100%                          |                                                     |                         |
| Initial Height (mm) =                      |                      |               | 19.18                       | X                                       | Measured ;                                                                               |                                             |                                                                        | Back Calculated                                     | Back-cal. Sat. (%) = NA |
| Final Height (mm) =                        |                      |               | 18.14                       | X                                       | Measured ;                                                                               |                                             |                                                                        | Initial H <sub>o</sub> & dial change during loading |                         |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) : |                                                     |                         |
| Initial                                    | 22.5                 | 0.649         | 94.8                        | 126.4                                   | 103.2                                                                                    | 11.627                                      | From                                                                   | To (ksf)                                            |                         |
| Final                                      | 20.8                 | 0.560         | 101.3                       | 131.7                                   | 109.1                                                                                    | NA                                          | NA                                                                     | NA                                                  |                         |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 68 | Minus 200 (%) |
| Casagrande Method      | 43.90             | NA                                | 0.141 | 0.065 | 9.6 | Plastic Limit (PL)    | 17 | 98.2          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 51 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP **HP**

Date: 4/18/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2359\_UD4a  
 Task No.: NA Date: Start: 4/7/2008 Initial Height,  $H_o$  (mm): 19.18  
 Project Name: Exelon (Victoria) Completed: 4/17/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6439  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b,BE}$  (psi): 70.5372 ,V: 0.02217552 Piston Uplift,  $P_{up}$  (lbf): 34.77  
 Back Pressure,  $U_{b,CS}$  (psi): 70.76277 ,V: 0.02224866 Setup  $DT_{ref}$  (V): 0.04639604  
 Displacement Transducer No.: DT-102 Calib. Factor (mm/V): -212.321 Ch. No.: 4  
 Pore Press. Transducer No.: PT-110 Calib. Factor (psi/V): 3084.04 Ref. Zero (V): -0.000696 Ch. No.: 5  
 Force Cell No.: FT-106 Calib. Factor (lbf/V): 161475.386 Ref. Zero (V): 0.000148 Ch. No.: 6

**Notes:**

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 98                    | 13 : 30 : 00         |                                                                    | 0.33                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 98                    | 13 : 44 : 00         |                                                                    | 1.32                                                        |                                                            | 0.043                                                         | 0.068                                                                 | -0.025                                                                  |                                                                              |
| BE                           | 99                    | 12 : 56 : 00         |                                                                    | 3.43                                                        | -0.032                                                     | 0.015                                                         | 0.121                                                                 | -0.106                                                                  |                                                                              |
| CS                           | 99                    | 12 : 57 : 00         | 0                                                                  | 3.48                                                        | 0.000                                                      | 0.015                                                         | 0.122                                                                 | -0.106                                                                  |                                                                              |
|                              | 99                    | 13 : 48 : 00         | 51                                                                 | 8.28                                                        | 3.892                                                      | 0.083                                                         | 0.181                                                                 | -0.098                                                                  | 0.049                                                                        |
|                              | 99                    | 14 : 39 : 00         | 102                                                                | 11.08                                                       | 6.042                                                      | 0.138                                                         | 0.205                                                                 | -0.067                                                                  | 0.196                                                                        |
|                              | 99                    | 16 : 12 : 00         | 195                                                                | 14.59                                                       | 8.344                                                      | 0.222                                                         | 0.231                                                                 | -0.008                                                                  | 0.197                                                                        |
| US                           | 99                    | 17 : 54 : 00         | 297                                                                | 18.49                                                       | 10.596                                                     | 0.314                                                         | 0.255                                                                 | 0.058                                                                   | 0.204                                                                        |
|                              | 99                    | 19 : 36 : 00         | 399                                                                | 22.71                                                       | 12.796                                                     | 0.407                                                         | 0.279                                                                 | 0.127                                                                   | 0.211                                                                        |
|                              | 99                    | 21 : 18 : 00         | 501                                                                | 26.94                                                       | 14.627                                                     | 0.498                                                         | 0.301                                                                 | 0.196                                                                   | 0.212                                                                        |
|                              | 99                    | 23 : 00 : 00         | 603                                                                | 31.54                                                       | 16.470                                                     | 0.591                                                         | 0.324                                                                 | 0.268                                                                   | 0.219                                                                        |
|                              | 100                   | 00 : 42 : 00         | 705                                                                | 36.13                                                       | 18.031                                                     | 0.682                                                         | 0.344                                                                 | 0.338                                                                   | 0.216                                                                        |
|                              | 100                   | 02 : 24 : 00         | 807                                                                | 40.90                                                       | 19.605                                                     | 0.775                                                         | 0.365                                                                 | 0.410                                                                   | 0.220                                                                        |
|                              | 100                   | 04 : 06 : 00         | 909                                                                | 45.86                                                       | 21.230                                                     | 0.862                                                         | 0.385                                                                 | 0.477                                                                   | 0.206                                                                        |
|                              | 100                   | 05 : 48 : 00         | 1011                                                               | 51.06                                                       | 23.072                                                     | 0.952                                                         | 0.405                                                                 | 0.547                                                                   | 0.215                                                                        |
|                              | 100                   | 07 : 30 : 00         | 1113                                                               | 56.48                                                       | 25.101                                                     | 1.041                                                         | 0.425                                                                 | 0.617                                                                   | 0.213                                                                        |
|                              | 100                   | 09 : 12 : 00         | 1215                                                               | 61.86                                                       | 27.037                                                     | 1.131                                                         | 0.444                                                                 | 0.688                                                                   | 0.218                                                                        |
|                              | 100                   | 10 : 54 : 00         | 1317                                                               | 66.76                                                       | 27.182                                                     | 1.221                                                         | 0.460                                                                 | 0.761                                                                   | 0.225                                                                        |
|                              | 100                   | 12 : 36 : 00         | 1419                                                               | 71.88                                                       | 27.694                                                     | 1.310                                                         | 0.477                                                                 | 0.833                                                                   | 0.220                                                                        |
|                              | 100                   | 14 : 18 : 00         | 1521                                                               | 76.70                                                       | 27.019                                                     | 1.398                                                         | 0.493                                                                 | 0.905                                                                   | 0.223                                                                        |
|                              | 100                   | 16 : 00 : 00         | 1623                                                               | 81.98                                                       | 27.237                                                     | 1.485                                                         | 0.509                                                                 | 0.976                                                                   | 0.217                                                                        |
|                              | 100                   | 17 : 42 : 00         | 1725                                                               | 87.57                                                       | 27.784                                                     | 1.574                                                         | 0.526                                                                 | 1.048                                                                   | 0.220                                                                        |
|                              | 100                   | 19 : 24 : 00         | 1827                                                               | 93.29                                                       | 28.588                                                     | 1.661                                                         | 0.543                                                                 | 1.118                                                                   | 0.216                                                                        |
| UE                           | 100                   | 21 : 06 : 00         | 1929                                                               | 99.25                                                       | 29.638                                                     | 1.748                                                         | 0.560                                                                 | 1.189                                                                   | 0.216                                                                        |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{af,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 100                   | 21 : 18 : 00         | 1941                                                               | 99.99                                                       | 29.773                                                     | 1.757                                                         | 0.562                                                                | 1.196                                                                   | 0.184                                                                        |
|                              | 100                   | 21 : 20 : 00         | 1943                                                               | 99.82                                                       | 29.595                                                     | 1.758                                                         | 0.561                                                                | 1.197                                                                   | 0.206                                                                        |
|                              | 101                   | 02 : 18 : 00         | 2241                                                               | 78.89                                                       | 5.796                                                      | 1.782                                                         | 0.518                                                                | 1.264                                                                   | 0.070                                                                        |
|                              | 101                   | 07 : 16 : 00         | 2539                                                               | 55.92                                                       | -6.350                                                     | 1.699                                                         | 0.465                                                                | 1.234                                                                   | -0.032                                                                       |
|                              | 101                   | 12 : 14 : 00         | 2837                                                               | 40.47                                                       | -9.521                                                     | 1.591                                                         | 0.424                                                                | 1.167                                                                   | -0.070                                                                       |
|                              | 101                   | 17 : 12 : 00         | 3135                                                               | 29.13                                                       | -10.517                                                    | 1.469                                                         | 0.388                                                                | 1.080                                                                   | -0.091                                                                       |
| US                           | 101                   | 22 : 10 : 00         | 3433                                                               | 20.90                                                       | -10.347                                                    | 1.339                                                         | 0.359                                                                | 0.981                                                                   | -0.105                                                                       |
|                              | 102                   | 03 : 08 : 00         | 3731                                                               | 14.73                                                       | -10.291                                                    | 1.203                                                         | 0.332                                                                | 0.871                                                                   | -0.115                                                                       |
|                              | 102                   | 08 : 06 : 00         | 4029                                                               | 9.62                                                        | -10.340                                                    | 1.065                                                         | 0.305                                                                | 0.760                                                                   | -0.116                                                                       |
|                              | 102                   | 13 : 04 : 00         | 4327                                                               | 5.99                                                        | -10.339                                                    | 0.925                                                         | 0.279                                                                | 0.646                                                                   | -0.120                                                                       |
| UE                           | 102                   | 18 : 02 : 00         | 4625                                                               | 3.11                                                        | -10.312                                                    | 0.775                                                         | 0.247                                                                | 0.528                                                                   | -0.124                                                                       |
|                              | 102                   | 22 : 58 : 00         | 4921                                                               | 1.23                                                        | -10.189                                                    | 0.631                                                         | 0.205                                                                | 0.427                                                                   | -0.107                                                                       |
|                              | 102                   | 23 : 00 : 00         | 4923                                                               | 1.27                                                        | -10.187                                                    | 0.629                                                         | 0.206                                                                | 0.423                                                                   | -0.612                                                                       |
|                              | 103                   | 01 : 08 : 00         | 5051                                                               | 7.72                                                        | -9.527                                                     | 0.703                                                         | 0.293                                                                | 0.411                                                                   | -0.029                                                                       |
|                              | 103                   | 03 : 16 : 00         | 5179                                                               | 13.67                                                       | -7.531                                                     | 0.809                                                         | 0.327                                                                | 0.482                                                                   | 0.175                                                                        |
|                              | 103                   | 05 : 24 : 00         | 5307                                                               | 20.28                                                       | -1.064                                                     | 0.913                                                         | 0.356                                                                | 0.557                                                                   | 0.183                                                                        |
| US                           | 103                   | 07 : 32 : 00         | 5435                                                               | 28.76                                                       | 8.952                                                      | 1.009                                                         | 0.387                                                                | 0.622                                                                   | 0.158                                                                        |
|                              | 103                   | 09 : 40 : 00         | 5563                                                               | 37.81                                                       | 16.563                                                     | 1.108                                                         | 0.416                                                                | 0.692                                                                   | 0.171                                                                        |
|                              | 103                   | 11 : 48 : 00         | 5691                                                               | 46.47                                                       | 22.603                                                     | 1.209                                                         | 0.440                                                                | 0.768                                                                   | 0.187                                                                        |
|                              | 103                   | 13 : 56 : 00         | 5819                                                               | 55.02                                                       | 27.117                                                     | 1.316                                                         | 0.463                                                                | 0.853                                                                   | 0.208                                                                        |
|                              | 103                   | 16 : 04 : 00         | 5947                                                               | 63.07                                                       | 28.968                                                     | 1.416                                                         | 0.483                                                                | 0.934                                                                   | 0.197                                                                        |
|                              | 103                   | 18 : 12 : 00         | 6075                                                               | 71.07                                                       | 29.681                                                     | 1.520                                                         | 0.501                                                                | 1.018                                                                   | 0.207                                                                        |
|                              | 103                   | 20 : 20 : 00         | 6203                                                               | 79.15                                                       | 29.973                                                     | 1.630                                                         | 0.519                                                                | 1.111                                                                   | 0.226                                                                        |
|                              | 103                   | 22 : 28 : 00         | 6331                                                               | 87.98                                                       | 30.263                                                     | 1.727                                                         | 0.538                                                                | 1.190                                                                   | 0.192                                                                        |
|                              | 104                   | 00 : 36 : 00         | 6459                                                               | 96.97                                                       | 30.649                                                     | 1.834                                                         | 0.556                                                                | 1.279                                                                   | 0.218                                                                        |
|                              | 104                   | 02 : 44 : 00         | 6587                                                               | 106.44                                                      | 31.456                                                     | 1.936                                                         | 0.579                                                                | 1.357                                                                   | 0.191                                                                        |
|                              | 104                   | 04 : 52 : 00         | 6715                                                               | 115.86                                                      | 32.775                                                     | 2.038                                                         | 0.604                                                                | 1.433                                                                   | 0.186                                                                        |
|                              | 104                   | 07 : 00 : 00         | 6843                                                               | 125.05                                                      | 34.395                                                     | 2.142                                                         | 0.628                                                                | 1.514                                                                   | 0.199                                                                        |
|                              | 104                   | 09 : 08 : 00         | 6971                                                               | 134.62                                                      | 36.473                                                     | 2.248                                                         | 0.652                                                                | 1.596                                                                   | 0.199                                                                        |
|                              | 104                   | 11 : 16 : 00         | 7099                                                               | 144.43                                                      | 38.639                                                     | 2.353                                                         | 0.675                                                                | 1.678                                                                   | 0.200                                                                        |
|                              | 104                   | 13 : 24 : 00         | 7227                                                               | 154.25                                                      | 40.360                                                     | 2.451                                                         | 0.698                                                                | 1.753                                                                   | 0.184                                                                        |
| UE                           | 104                   | 15 : 32 : 00         | 7355                                                               | 164.79                                                      | 42.481                                                     | 2.553                                                         | 0.722                                                                | 1.831                                                                   | 0.191                                                                        |
|                              | 104                   | 17 : 40 : 00         | 7483                                                               | 175.23                                                      | 44.328                                                     | 2.655                                                         | 0.745                                                                | 1.910                                                                   | 0.192                                                                        |
|                              | 104                   | 17 : 48 : 00         | 7491                                                               | 175.77                                                      | 44.534                                                     | 2.666                                                         | 0.746                                                                | 1.920                                                                   | 0.380                                                                        |
|                              | 104                   | 17 : 50 : 00         | 7493                                                               | 175.67                                                      | 44.398                                                     | 2.666                                                         | 0.746                                                                | 1.920                                                                   | 0.087                                                                        |
|                              | 105                   | 00 : 46 : 00         | 7909                                                               | 147.08                                                      | 9.652                                                      | 2.703                                                         | 0.701                                                                | 2.002                                                                   | 0.061                                                                        |
|                              | 105                   | 07 : 42 : 00         | 8325                                                               | 109.21                                                      | -6.958                                                     | 2.599                                                         | 0.635                                                                | 1.964                                                                   | -0.029                                                                       |
|                              | 105                   | 14 : 38 : 00         | 8741                                                               | 80.61                                                       | -10.402                                                    | 2.465                                                         | 0.578                                                                | 1.887                                                                   | -0.058                                                                       |
|                              | 105                   | 21 : 34 : 00         | 9157                                                               | 59.35                                                       | -10.133                                                    | 2.319                                                         | 0.530                                                                | 1.789                                                                   | -0.073                                                                       |
| US                           | 106                   | 04 : 30 : 00         | 9573                                                               | 43.16                                                       | -10.202                                                    | 2.149                                                         | 0.487                                                                | 1.662                                                                   | -0.096                                                                       |
|                              | 106                   | 11 : 26 : 00         | 9989                                                               | 30.84                                                       | -10.471                                                    | 1.975                                                         | 0.450                                                                | 1.525                                                                   | -0.103                                                                       |
|                              | 106                   | 18 : 22 : 00         | 10405                                                              | 21.19                                                       | -10.657                                                    | 1.790                                                         | 0.416                                                                | 1.374                                                                   | -0.114                                                                       |



### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-2

☒ Undisturbed or ; ☐ Reconstituted - Specimen.

File Name: B-2359\_UD4

Task No.: NA Date: Start: 4/7/2008

Back Pressure,  $U_{b,CS}$  (psi): 70.8 Piston Uplift,  $P_{up}$  (lbf): 34.77

Project Name: Exelon (Victoria) Completed: 4/17/2008

Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA

☐ Data corrected for salt ; in ☐ g/kg

Final Description of Specimen: Light Gray Fat CLAY (CH)

Ring No.: 10 Area,  $A_r$  (cm<sup>2</sup>): 31.644 Solids Ht.,  $H_s$  (mm): 11.627 Specific Gravity,  $G_s = 2.730$  ☒ Meas. ; ☐ Assumed

**Initial:** Height  $H_o$ : 19.18 Water 22.5 Void 0.649 Deg. of 94.8 Total Unit 126.4 Dry Unit 103.2

**Final:** (mm):  $H_f$ : 18.14 Content,  $w$  (%): 20.8 Ratio,  $e$ : 0.560 Sat.,  $S$  (%): 101.3 Weight,  $\gamma_t$  (pcf): 131.7 Weight,  $\gamma_d$  (pcf): 109.1

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *HP*

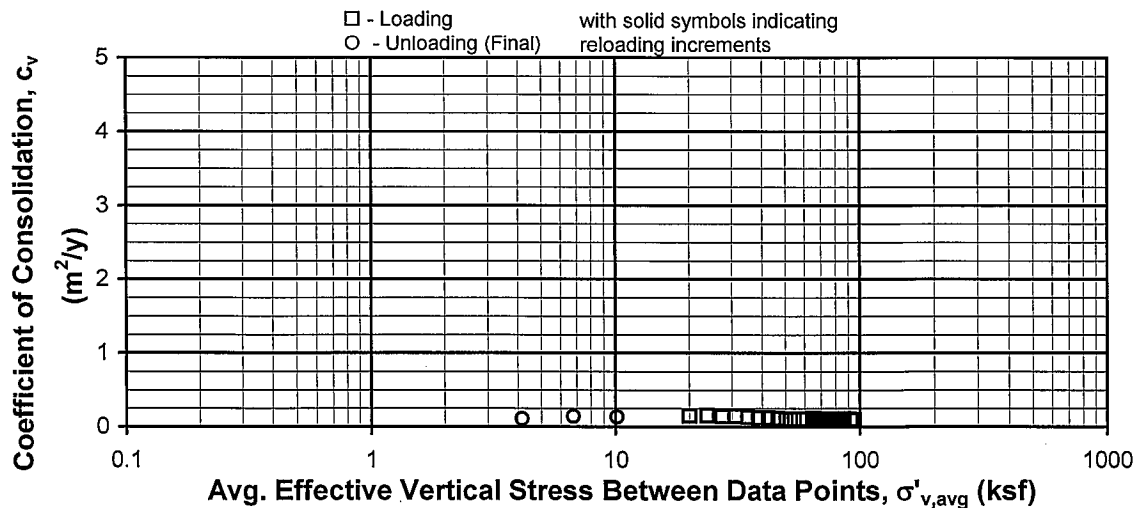
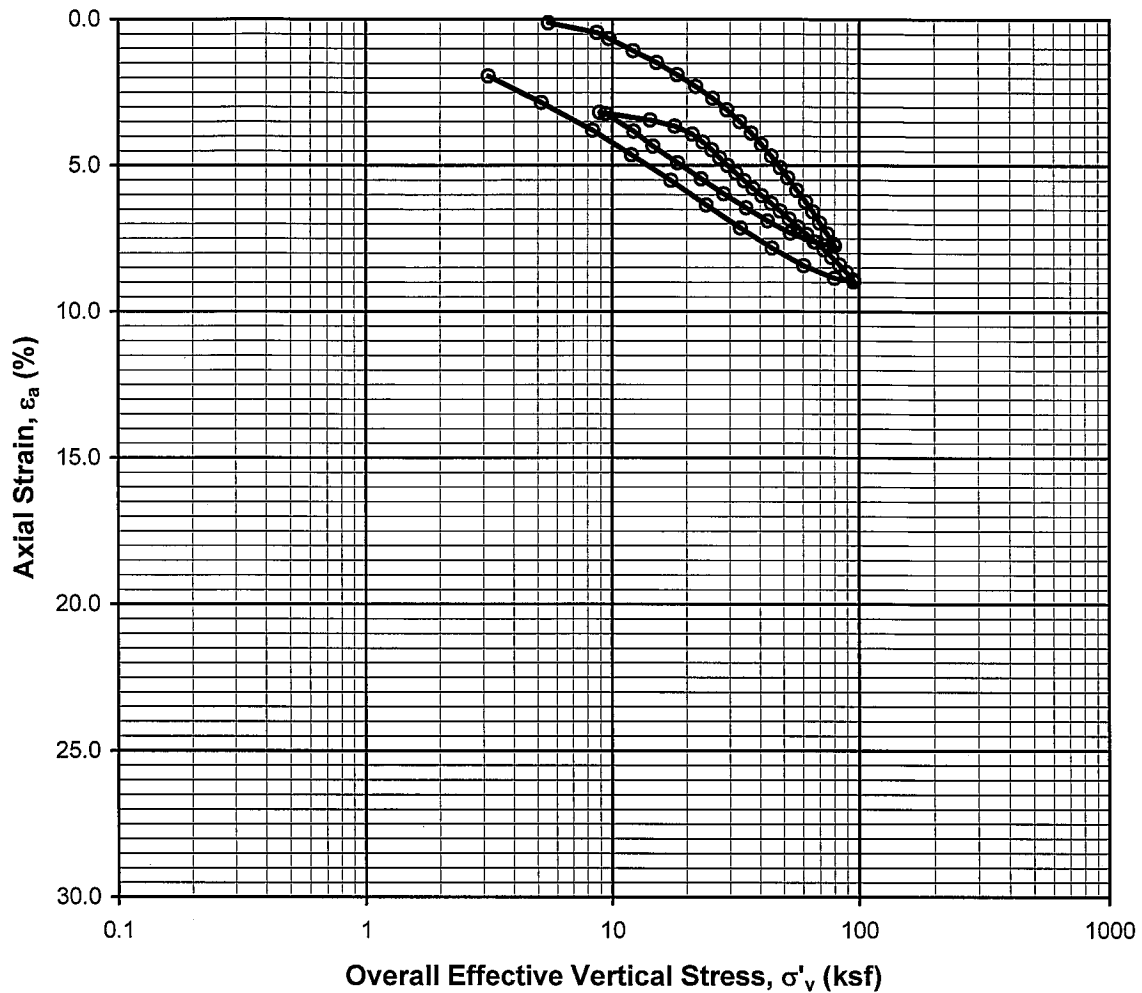
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.33                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BS                           |                                                                          |                                                                         | -0.13                                                                                                                 | 0.651                              | 1.32                                                    |                                                                |                                                                                         | 19.201                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                |                                                                                                  |
| BE                           |                                                                          | 3.45                                                                    | -0.55                                                                                                                 | 0.658                              | 3.43                                                    | -0.032                                                         | -0.9                                                                                    | 19.282                                                |                                                                           |                                                                     | 0.655                                  |                                                   |                                                                                                |                                                                                                  |
| CS                           | 0                                                                        | 3.48                                                                    | -0.55                                                                                                                 | 0.658                              | 3.48                                                    | 0.000                                                          | 0.0                                                                                     | 19.282                                                |                                                                           |                                                                     | 0.658                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 51                                                                       | 5.42                                                                    | -0.51                                                                                                                 | 0.658                              | 8.28                                                    | 3.892                                                          | 47.0                                                                                    | 19.274                                                | 4.45                                                                      |                                                                     | 0.658                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 102                                                                      | 6.55                                                                    | -0.35                                                                                                                 | 0.655                              | 11.08                                                   | 6.042                                                          | 54.5                                                                                    | 19.243                                                | 5.99                                                                      |                                                                     | 0.656                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 195                                                                      | 8.28                                                                    | -0.04                                                                                                                 | 0.650                              | 14.59                                                   | 8.344                                                          | 57.2                                                                                    | 19.184                                                | 7.42                                                                      |                                                                     | 0.652                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 297                                                                      | 10.49                                                                   | 0.30                                                                                                                  | 0.644                              | 18.49                                                   | 10.596                                                         | 57.3                                                                                    | 19.118                                                | 9.38                                                                      |                                                                     | 0.647                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 399                                                                      | 13.07                                                                   | 0.66                                                                                                                  | 0.638                              | 22.71                                                   | 12.796                                                         | 56.3                                                                                    | 19.049                                                | 11.78                                                                     |                                                                     | 0.641                                  |                                                   | 0.24                                                                                           |                                                                                                  |
|                              | 501                                                                      | 15.99                                                                   | 1.02                                                                                                                  | 0.632                              | 26.94                                                   | 14.627                                                         | 54.3                                                                                    | 18.980                                                | 14.53                                                                     |                                                                     | 0.635                                  |                                                   | 0.43                                                                                           |                                                                                                  |
|                              | 603                                                                      | 19.28                                                                   | 1.40                                                                                                                  | 0.626                              | 31.54                                                   | 16.470                                                         | 52.2                                                                                    | 18.908                                                | 17.63                                                                     |                                                                     | 0.629                                  |                                                   | 0.62                                                                                           |                                                                                                  |
|                              | 705                                                                      | 22.79                                                                   | 1.76                                                                                                                  | 0.620                              | 36.13                                                   | 18.031                                                         | 49.9                                                                                    | 18.838                                                | 21.03                                                                     |                                                                     | 0.623                                  |                                                   | 0.76                                                                                           |                                                                                                  |
|                              | 807                                                                      | 26.47                                                                   | 2.14                                                                                                                  | 0.614                              | 40.90                                                   | 19.605                                                         | 47.9                                                                                    | 18.766                                                | 24.63                                                                     |                                                                     | 0.617                                  |                                                   | 0.92                                                                                           |                                                                                                  |
|                              | 909                                                                      | 30.30                                                                   | 2.49                                                                                                                  | 0.608                              | 45.86                                                   | 21.230                                                         | 46.3                                                                                    | 18.699                                                | 28.38                                                                     | 0.16                                                                | 0.611                                  | 3.58E-05                                          | 1.08                                                                                           |                                                                                                  |
|                              | 1011                                                                     | 34.20                                                                   | 2.85                                                                                                                  | 0.602                              | 51.06                                                   | 23.072                                                         | 45.2                                                                                    | 18.629                                                | 32.25                                                                     | 0.16                                                                | 0.605                                  | 3.40E-05                                          | 1.23                                                                                           |                                                                                                  |
|                              | 1113                                                                     | 38.17                                                                   | 3.22                                                                                                                  | 0.596                              | 56.48                                                   | 25.101                                                         | 44.4                                                                                    | 18.559                                                | 36.19                                                                     | 0.15                                                                | 0.599                                  | 3.06E-05                                          | 1.36                                                                                           |                                                                                                  |
|                              | 1215                                                                     | 42.18                                                                   | 3.59                                                                                                                  | 0.590                              | 61.86                                                   | 27.037                                                         | 43.7                                                                                    | 18.488                                                | 40.17                                                                     | 0.14                                                                | 0.593                                  | 2.87E-05                                          | 1.41                                                                                           |                                                                                                  |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

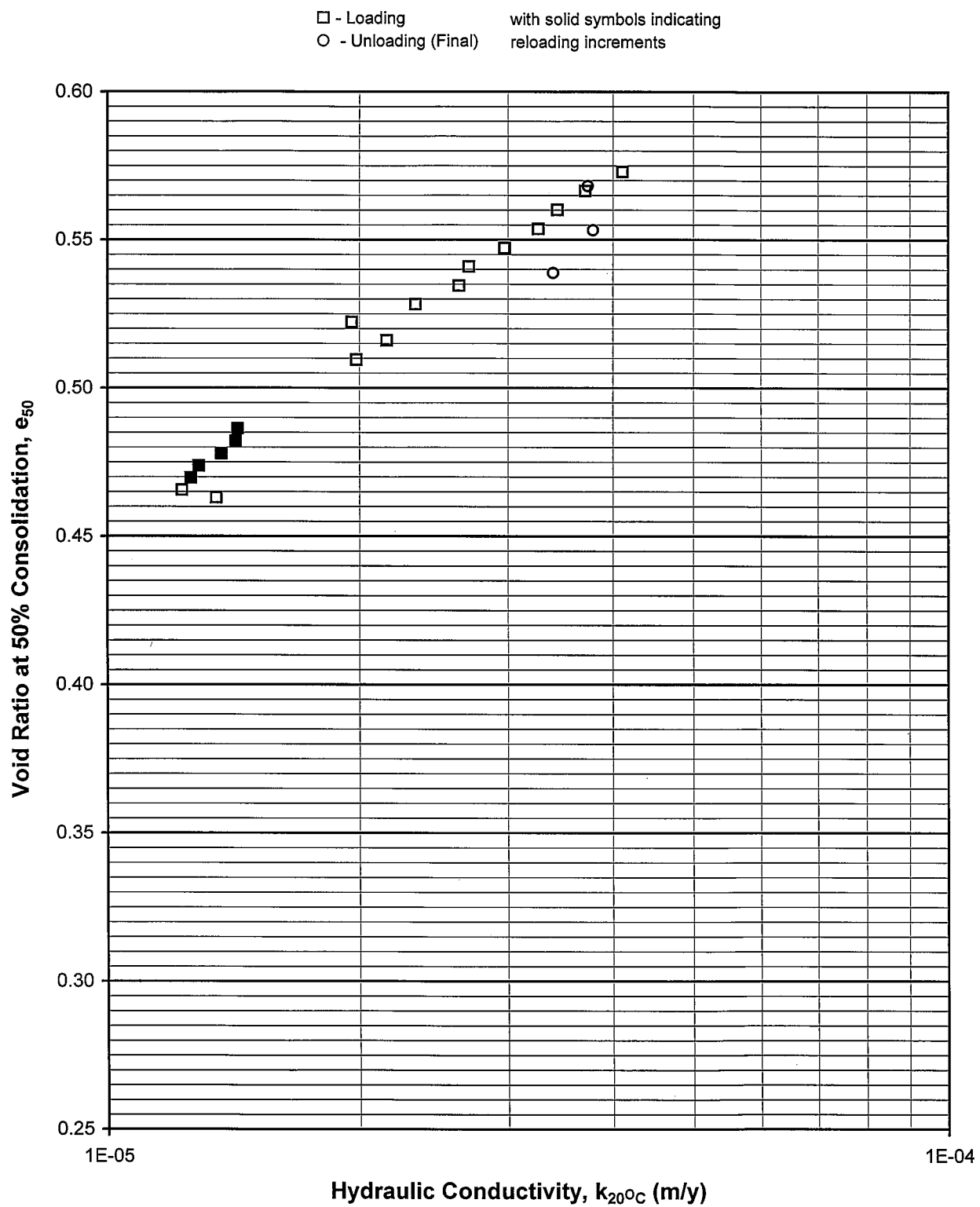
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
|                              | 1317                                                                     | 47.11                                                                   | 3.97                                                                                                                        | 0.584                              | 66.76                                                   | 27.182                                                         | 40.7                                                                                    | 18.415                                                | 44.64                                                                     | 0.12                                                        | 0.587                                  | 2.81E-05                                          | 1.39                                                                                           |                                                                                                  |
|                              | 1419                                                                     | 51.97                                                                   | 4.34                                                                                                                        | 0.578                              | 71.88                                                   | 27.694                                                         | 38.5                                                                                    | 18.343                                                | 49.54                                                                     | 0.13                                                        | 0.581                                  | 2.66E-05                                          | 1.61                                                                                           |                                                                                                  |
|                              | 1521                                                                     | 57.42                                                                   | 4.72                                                                                                                        | 0.571                              | 76.70                                                   | 27.019                                                         | 35.2                                                                                    | 18.271                                                | 54.69                                                                     | 0.12                                                        | 0.574                                  | 2.66E-05                                          | 1.69                                                                                           |                                                                                                  |
|                              | 1623                                                                     | 62.63                                                                   | 5.09                                                                                                                        | 0.565                              | 81.98                                                   | 27.237                                                         | 33.2                                                                                    | 18.200                                                | 60.03                                                                     | 0.14                                                        | 0.568                                  | 2.57E-05                                          | 2.07                                                                                           |                                                                                                  |
|                              | 1725                                                                     | 67.90                                                                   | 5.46                                                                                                                        | 0.559                              | 87.57                                                   | 27.784                                                         | 31.7                                                                                    | 18.128                                                | 65.27                                                                     | 0.14                                                        | 0.562                                  | 2.53E-05                                          | 2.35                                                                                           |                                                                                                  |
|                              | 1827                                                                     | 73.10                                                                   | 5.83                                                                                                                        | 0.553                              | 93.29                                                   | 28.588                                                         | 30.6                                                                                    | 18.058                                                | 70.50                                                                     | 0.14                                                        | 0.556                                  | 2.40E-05                                          | 2.54                                                                                           |                                                                                                  |
| UE                           | 1929                                                                     | 78.35                                                                   | 6.20                                                                                                                        | 0.547                              | 99.25                                                   | 29.638                                                         | 29.9                                                                                    | 17.987                                                | 75.72                                                                     | 0.14                                                        | 0.550                                  | 2.30E-05                                          | 2.75                                                                                           |                                                                                                  |
|                              | 1941                                                                     | 78.99                                                                   | 6.24                                                                                                                        | 0.546                              | 99.99                                                   | 29.773                                                         | 29.8                                                                                    | 17.980                                                | 78.67                                                                     |                                                             | 0.547                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 1943                                                                     | 78.96                                                                   | 6.24                                                                                                                        | 0.546                              | 99.82                                                   | 29.595                                                         | 29.6                                                                                    | 17.979                                                | 78.98                                                                     |                                                             | 0.546                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 2241                                                                     | 74.98                                                                   | 6.59                                                                                                                        | 0.541                              | 78.89                                                   | 5.796                                                          | 7.3                                                                                     | 17.912                                                | 76.97                                                                     |                                                             | 0.543                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 2539                                                                     | 60.07                                                                   | 6.43                                                                                                                        | 0.543                              | 55.92                                                   | -6.350                                                         | -11.4                                                                                   | 17.942                                                | 67.53                                                                     |                                                             | 0.542                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 2837                                                                     | 46.59                                                                   | 6.09                                                                                                                        | 0.549                              | 40.47                                                   | -9.521                                                         | -23.5                                                                                   | 18.009                                                | 53.33                                                                     |                                                             | 0.546                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 3135                                                                     | 35.77                                                                   | 5.63                                                                                                                        | 0.556                              | 29.13                                                   | -10.517                                                        | -36.1                                                                                   | 18.096                                                | 41.18                                                                     |                                                             | 0.553                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 3433                                                                     | 27.32                                                                   | 5.11                                                                                                                        | 0.565                              | 20.90                                                   | -10.347                                                        | -49.5                                                                                   | 18.195                                                | 31.55                                                                     |                                                             | 0.561                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 3731                                                                     | 20.97                                                                   | 4.54                                                                                                                        | 0.574                              | 14.73                                                   | -10.291                                                        | -69.8                                                                                   | 18.305                                                | 24.15                                                                     |                                                             | 0.570                                  |                                                   | 0.76                                                                                           |                                                                                                  |
|                              | 4029                                                                     | 15.65                                                                   | 3.97                                                                                                                        | 0.584                              | 9.62                                                    | -10.340                                                        | -107.5                                                                                  | 18.416                                                | 18.31                                                                     | 0.21                                                        | 0.579                                  | 3.11E-05                                          | 1.39                                                                                           |                                                                                                  |
|                              | 4327                                                                     | 11.69                                                                   | 3.37                                                                                                                        | 0.594                              | 5.99                                                    | -10.339                                                        | -172.5                                                                                  | 18.530                                                | 13.67                                                                     | 0.17                                                        | 0.589                                  | 3.17E-05                                          | 1.68                                                                                           |                                                                                                  |
| UE                           | 4625                                                                     | 8.25                                                                    | 2.75                                                                                                                        | 0.604                              | 3.11                                                    | -10.312                                                        | -331.4                                                                                  | 18.648                                                | 9.97                                                                      | 0.17                                                        | 0.599                                  | 3.26E-05                                          | 2.21                                                                                           |                                                                                                  |
|                              | 4921                                                                     | 5.43                                                                    | 2.23                                                                                                                        | 0.612                              | 1.23                                                    | -10.189                                                        | -830.6                                                                                  | 18.749                                                | 6.84                                                                      |                                                             | 0.608                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 4923                                                                     | 5.51                                                                    | 2.21                                                                                                                        | 0.613                              | 1.27                                                    | -10.187                                                        | -801.3                                                                                  | 18.753                                                | 5.47                                                                      |                                                             | 0.613                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5051                                                                     | 13.19                                                                   | 2.14                                                                                                                        | 0.614                              | 7.72                                                    | -9.527                                                         | -123.4                                                                                  | 18.765                                                | 9.35                                                                      |                                                             | 0.613                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5179                                                                     | 18.32                                                                   | 2.52                                                                                                                        | 0.608                              | 13.67                                                   | -7.531                                                         | -55.1                                                                                   | 18.694                                                | 15.76                                                                     |                                                             | 0.611                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5307                                                                     | 20.98                                                                   | 2.91                                                                                                                        | 0.601                              | 20.28                                                   | -1.064                                                         | -5.2                                                                                    | 18.619                                                | 19.65                                                                     |                                                             | 0.604                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 5435                                                                     | 22.43                                                                   | 3.24                                                                                                                        | 0.596                              | 28.76                                                   | 8.952                                                          | 31.1                                                                                    | 18.554                                                | 21.71                                                                     |                                                             | 0.598                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5563                                                                     | 25.74                                                                   | 3.61                                                                                                                        | 0.590                              | 37.81                                                   | 16.563                                                         | 43.8                                                                                    | 18.484                                                | 24.09                                                                     |                                                             | 0.593                                  |                                                   | 0.57                                                                                           |                                                                                                  |
|                              | 5691                                                                     | 29.80                                                                   | 4.01                                                                                                                        | 0.583                              | 46.47                                                   | 22.603                                                         | 48.6                                                                                    | 18.408                                                | 27.77                                                                     |                                                             | 0.586                                  |                                                   | 0.66                                                                                           |                                                                                                  |
|                              | 5819                                                                     | 34.99                                                                   | 4.45                                                                                                                        | 0.576                              | 55.02                                                   | 27.117                                                         | 49.3                                                                                    | 18.323                                                | 32.40                                                                     |                                                             | 0.579                                  |                                                   | 0.75                                                                                           |                                                                                                  |
|                              | 5947                                                                     | 41.86                                                                   | 4.87                                                                                                                        | 0.569                              | 63.07                                                   | 28.968                                                         | 45.9                                                                                    | 18.242                                                | 38.43                                                                     |                                                             | 0.572                                  |                                                   | 0.85                                                                                           |                                                                                                  |
|                              | 6075                                                                     | 49.57                                                                   | 5.31                                                                                                                        | 0.562                              | 71.07                                                   | 29.681                                                         | 41.8                                                                                    | 18.158                                                | 45.71                                                                     | 0.14                                                        | 0.565                                  | 2.33E-05                                          | 1.04                                                                                           |                                                                                                  |
|                              | 6203                                                                     | 57.63                                                                   | 5.79                                                                                                                        | 0.554                              | 79.15                                                   | 29.973                                                         | 37.9                                                                                    | 18.065                                                | 53.60                                                                     | 0.14                                                        | 0.558                                  | 2.45E-05                                          | 1.28                                                                                           |                                                                                                  |

## DCN# EXE812

**FUGRO CONSULTANTS, INC.**



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-5A - Depth 40.0 - 41.7 ft  
 Boring B-2359UD



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-5A - Depth 40.0 - 41.7 ft  
 Boring B-2359UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2359\_UD5a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Meas.; ☐ Assumed Ring No.: 8  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.686  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                               |                                                      |                                |                                   |                                  |                                 |                         |
|---------------------------------------------------------------|------------------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube                      | <input type="checkbox"/> Field Extruded              | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                                          | <input type="checkbox"/> LPC Core                    |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =              | No. Layers =            |
| Sample No.: UD-5                                              | Compostite No.:                                      |                                |                                   | Pluviated:                       | Tamper Force (lb) =             | Drop (in.) =            |
| Depth (ft): 40.0 - 41.7                                       | Specimen No.: A                                      |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input checked="" type="checkbox"/> Spec. Selection by X-ray; | <input checked="" type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                   | % Comp. = $\pm$ Opt. =  |

| Water<br>Content (W);                                    | Initial - Trimming Location |                         |            |   | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|----------------------------------------------------------|-----------------------------|-------------------------|------------|---|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                                          | Top (W1)                    | Bottom (W2)             | Sides (W3) |   |                                       | Mass Moist Soil + Ring (g)                                 | 339.87  | 340.16 |
| Container No.                                            | 522                         | 678                     | 912        |   | 1109                                  | Mass Ring (g)                                              | 214.27  |        |
| Mass Moist Soil + Container (g)                          | 113.06                      | 129.78                  | 109.43     |   | 67.39                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 125.60  | 125.89 |
| Mass Dry Soil + Container (g)                            | 100.03                      | 114.67                  | 97.39      |   | 61.13                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                                       | 30.24                       | 32.04                   | 31.72      |   | 31.81                                 | Container No.                                              |         | 5042   |
| WATER CONTENT (%)                                        | 18.67                       | 18.29                   | 18.33      |   | 21.35                                 | Mass Dry Soil + Container (g)                              |         | 31.06  |
| Avg. Initial Water Content, W4 (%)                       | 18.43                       | Final W <sub>at</sub> : |            | X | Slice ;                               | Whole Spec.                                                |         |        |
| See attached data sheet(s) for additional water contents |                             |                         |            |   |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 0.08   |

| Soil Height: Measurements (mm)                                                                                                                                              |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |  | Initial                                                             | Final  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|--|---------------------------------------------------------------------|--------|
| Initial                                                                                                                                                                     |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |  | 0.000                                                               | 19.080 |
| with Spec.                                                                                                                                                                  | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |  | 0.000                                                               | 0.000  |
| 19.190                                                                                                                                                                      | 0.000                                  | 13.110                                    | 13.250                      | Avg. Reading on Soil, $d_{soil}$                        |  | 19.176                                                              | 13.096 |
| 19.160                                                                                                                                                                      | 0.000                                  | 13.060                                    | 13.200                      | Avg. Reading on Apparatus without Specimen, $d_{app}$   |  | 0.000                                                               | 13.228 |
| 19.210                                                                                                                                                                      | 0.000                                  | 13.140                                    | 13.300                      | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |  | 19.176                                                              | 18.948 |
| 19.170                                                                                                                                                                      | 0.000                                  | 13.120                                    | 13.230                      | Soil Height: Final by Dial Change During Test (mm)      |  |                                                                     |        |
| 19.150                                                                                                                                                                      | 0.000                                  | 13.050                                    | 13.160                      | Initial Height, $H_o$                                   |  | 19.176                                                              |        |
| <input type="checkbox"/> Yes ;                                                                                                                                              | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         |  | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ |        |
| <input type="checkbox"/> Yes ;                                                                                                                                              | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  |  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec.: ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             |                                                         |  | Final Soil Height Measurement, $H_{f,m}$                            |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                         |                                        |                                           |                             |                                                         |  | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               |        |
|                                                                                                                                                                             |                                        |                                           |                             |                                                         |  | -0.75                                                               |        |

| Estimated Initial Unit Weight                                                              |        |                             |        | Soil Extruded During Loading                            |      |
|--------------------------------------------------------------------------------------------|--------|-----------------------------|--------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                              | 129.05 | Dry, $\gamma_{d,o}$ (pcf) = | 108.96 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54;                     |        |                             |        | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No |        |                             |        | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No  |        |                             |        | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Pale Brown Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG  
 Date: 4/5/2008 Date: 4/5/2008 Final Calc. By: DH Date: 4/21/2008  
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2359\_UD5a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.710 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 18.67                    | 105.84                   | 91.5                         | 96.0                  | 98.2  |
| 2                | " Bottom, W2          | 18.29                    | 106.18                   | 90.4                         | 95.0                  | 97.1  |
| 3                | " Sides, W3           | 18.33                    | 106.14                   | 90.6                         | 95.1                  | 97.2  |
| 4                | " Average, W4         | 18.43                    | 106.05                   | 90.8                         | 95.4                  | 97.5  |
| 5                | " Back Calculated (1) | 20.98                    | 103.82 (3)               | 97.5                         | 102.1                 | 104.3 |
| 6                | Final                 | 21.35                    | 103.82 (2)               | 97.5                         | 102.1                 | 104.3 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.742</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.726</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11667 |
| Final Selected, $K_f$                                                           | 0.11667 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>104.53</u>                                                                |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>104.18</u>                                         |  |                              |

| Summary of Specimen Physical Properties    |                      |               |                             |                                         |                                                                                          |                                             |                                                                        |                                                     |                         |
|--------------------------------------------|----------------------|---------------|-----------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------|-------------------------|
| Specific Gravity<br>G <sub>s</sub> = 2.710 |                      |               | Assumed                     |                                         | To make S <sub>f</sub> = 100% at end of test.                                            |                                             |                                                                        |                                                     |                         |
|                                            |                      | X             | Measured                    |                                         | Avg. of measured/assumed G <sub>s</sub> and G <sub>s</sub> to make S <sub>f</sub> = 100% |                                             |                                                                        |                                                     |                         |
| Mass Dry Soil, (g)                         | Initial:             | 103.82        | X                           | From Cal. Routine No.                   |                                                                                          | 5                                           | Note: Routine #5 is based on final measurements.                       |                                                     |                         |
|                                            | Final (4):           | NA            |                             | Make S <sub>f</sub> = 100%, or;         |                                                                                          |                                             | Avg. of measured & make S <sub>f</sub> = 100%                          |                                                     |                         |
| Initial Height (mm) =                      |                      |               | 19.18                       | X                                       | Measured ;                                                                               |                                             |                                                                        | Back Calculated                                     | Back-cal. Sat. (%) = NA |
| Final Height (mm) =                        |                      |               | 18.95                       | X                                       | Measured ;                                                                               |                                             |                                                                        | Initial H <sub>o</sub> & dial change during loading |                         |
|                                            | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, γ <sub>t</sub> (pcf) | Dry Unit Weight, γ <sub>d</sub> (pcf)                                                    | Height of Solids, H <sub>s</sub> (2,4) (mm) | Extruded soil loss proportioned in increasing loading increments (5) : |                                                     |                         |
| Initial                                    | 21.0                 | 0.583         | 97.5                        | 129.0                                   | 106.7                                                                                    | 12.112                                      | From                                                                   | To (ksf)                                            |                         |
| Final                                      | 21.3                 | 0.564         | 102.1                       | 130.9                                   | 108.0                                                                                    | NA                                          | NA                                                                     | NA                                                  |                         |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 65 | Minus 200 (%) |
| Casagrande Method      | 39.90             | NA                                | 0.155 | 0.070 | 7.8 | Plastic Limit (PL)    | 18 | 93.4          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 47 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP  
 Date: 4/23/2008



# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-8 File Name: B-2359\_UD5a  
 Task No.: NA Date; Start: 4/5/2008 Initial Height,  $H_o$  (mm): 19.18  
 Project Name: Exelon (Victoria) Completed: 4/21/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6861  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 71.45941,  $V$ : 0.023465915 Piston Uplift,  $P_{up}$  (lbf): 35.12  
 Back Pressure,  $U_{b, CS}$  (psi): 71.45654,  $V$ : 0.023464961 Setup  $DT_{ref}$  (V): 0.001991837  
 Displacement Transducer No.: DT-108 Calib. Factor (mm/V): 227.98906 Ch. No.: 2  
 Pore Press. Transducer No.: PT-116 Calib. Factor (psi/V): 3007.15024 Ref. Zero (V): -0.000297 Ch. No.: 3  
 Force Cell No.: FT-108 Calib. Factor (lbf/V): -156066.76 Ref. Zero (V): -0.000009 Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ), corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 96                    | 11 : 19 : 11         |                                                                    | 0.41                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 96                    | 11 : 56 : 47         |                                                                    | 2.45                                                        |                                                            | 0.040                                                         | 0.000                                                                 | 0.040                                                                   |                                                                              |
| BE                           | 97                    | 16 : 07 : 14         |                                                                    | 5.53                                                        | 0.000                                                      | 0.023                                                         | 0.000                                                                 | 0.023                                                                   |                                                                              |
| CS                           | 97                    | 16 : 07 : 18         | 0                                                                  | 5.53                                                        | 0.000                                                      | 0.022                                                         | 0.000                                                                 | 0.022                                                                   |                                                                              |
|                              | 97                    | 17 : 44 : 45         | 97                                                                 | 10.28                                                       | 2.295                                                      | 0.085                                                         | 0.000                                                                 | 0.085                                                                   | 0.203                                                                        |
|                              | 97                    | 20 : 21 : 21         | 254                                                                | 12.38                                                       | 3.802                                                      | 0.127                                                         | 0.000                                                                 | 0.127                                                                   | 0.083                                                                        |
| US                           | 98                    | 01 : 21 : 23         | 554                                                                | 15.88                                                       | 5.247                                                      | 0.206                                                         | 0.000                                                                 | 0.206                                                                   | 0.082                                                                        |
|                              | 98                    | 06 : 21 : 24         | 854                                                                | 19.36                                                       | 6.027                                                      | 0.284                                                         | 0.000                                                                 | 0.284                                                                   | 0.082                                                                        |
|                              | 98                    | 11 : 21 : 27         | 1154                                                               | 22.87                                                       | 6.512                                                      | 0.362                                                         | 0.000                                                                 | 0.362                                                                   | 0.081                                                                        |
|                              | 98                    | 16 : 21 : 29         | 1454                                                               | 26.56                                                       | 6.870                                                      | 0.441                                                         | 0.000                                                                 | 0.441                                                                   | 0.082                                                                        |
|                              | 98                    | 21 : 21 : 31         | 1754                                                               | 30.53                                                       | 7.246                                                      | 0.517                                                         | 0.000                                                                 | 0.517                                                                   | 0.080                                                                        |
|                              | 99                    | 02 : 21 : 32         | 2054                                                               | 34.39                                                       | 7.624                                                      | 0.593                                                         | 0.000                                                                 | 0.593                                                                   | 0.079                                                                        |
|                              | 99                    | 07 : 21 : 34         | 2354                                                               | 38.60                                                       | 8.254                                                      | 0.670                                                         | 0.000                                                                 | 0.670                                                                   | 0.081                                                                        |
|                              | 99                    | 12 : 21 : 37         | 2654                                                               | 42.75                                                       | 8.844                                                      | 0.746                                                         | 0.000                                                                 | 0.746                                                                   | 0.080                                                                        |
|                              | 99                    | 17 : 21 : 38         | 2954                                                               | 46.86                                                       | 9.274                                                      | 0.821                                                         | 0.000                                                                 | 0.821                                                                   | 0.078                                                                        |
|                              | 99                    | 22 : 21 : 41         | 3254                                                               | 51.29                                                       | 9.864                                                      | 0.898                                                         | 0.000                                                                 | 0.898                                                                   | 0.081                                                                        |
|                              | 100                   | 03 : 21 : 43         | 3554                                                               | 55.71                                                       | 10.613                                                     | 0.972                                                         | 0.000                                                                 | 0.972                                                                   | 0.077                                                                        |
|                              | 100                   | 08 : 21 : 44         | 3854                                                               | 60.04                                                       | 11.660                                                     | 1.041                                                         | 0.000                                                                 | 1.041                                                                   | 0.071                                                                        |
|                              | 100                   | 13 : 21 : 45         | 4154                                                               | 64.75                                                       | 12.005                                                     | 1.121                                                         | 0.000                                                                 | 1.121                                                                   | 0.084                                                                        |
| UE                           | 100                   | 18 : 21 : 47         | 4454                                                               | 69.52                                                       | 11.831                                                     | 1.196                                                         | 0.000                                                                 | 1.196                                                                   | 0.079                                                                        |
|                              | 100                   | 23 : 21 : 49         | 4755                                                               | 74.72                                                       | 13.303                                                     | 1.261                                                         | 0.000                                                                 | 1.261                                                                   | 0.068                                                                        |
|                              | 101                   | 04 : 21 : 50         | 5055                                                               | 80.02                                                       | 14.700                                                     | 1.335                                                         | 0.000                                                                 | 1.335                                                                   | 0.077                                                                        |
|                              | 101                   | 09 : 21 : 52         | 5355                                                               | 85.43                                                       | 15.591                                                     | 1.407                                                         | 0.000                                                                 | 1.407                                                                   | 0.075                                                                        |
|                              | 101                   | 14 : 21 : 54         | 5655                                                               | 90.64                                                       | 16.346                                                     | 1.473                                                         | 0.000                                                                 | 1.473                                                                   | 0.069                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 101                   | 15 : 04 : 31         | 5697                                                               | 91.44                                                       | 16.531                                                     | 1.487                                                         | 0.000                                                                 | 1.487                                                                   | 0.105                                                                        |
|                              | 101                   | 15 : 21 : 54         | 5715                                                               | 90.95                                                       | 16.079                                                     | 1.489                                                         | 0.000                                                                 | 1.489                                                                   | 0.028                                                                        |
|                              | 102                   | 04 : 51 : 59         | 6525                                                               | 67.29                                                       | 1.439                                                      | 1.459                                                         | 0.000                                                                 | 1.459                                                                   | -0.012                                                                       |
|                              | 102                   | 18 : 22 : 03         | 7335                                                               | 51.99                                                       | -1.713                                                     | 1.402                                                         | 0.000                                                                 | 1.402                                                                   | -0.022                                                                       |
|                              | 103                   | 07 : 52 : 09         | 8145                                                               | 40.83                                                       | -3.121                                                     | 1.324                                                         | 0.000                                                                 | 1.324                                                                   | -0.030                                                                       |
| US                           | 103                   | 21 : 22 : 14         | 8955                                                               | 32.04                                                       | -4.380                                                     | 1.237                                                         | 0.000                                                                 | 1.237                                                                   | -0.033                                                                       |
|                              | 104                   | 10 : 52 : 19         | 9765                                                               | 24.98                                                       | -5.037                                                     | 1.145                                                         | 0.000                                                                 | 1.145                                                                   | -0.036                                                                       |
|                              | 105                   | 00 : 22 : 23         | 10575                                                              | 19.37                                                       | -5.486                                                     | 1.045                                                         | 0.000                                                                 | 1.045                                                                   | -0.039                                                                       |
|                              | 105                   | 13 : 52 : 28         | 11385                                                              | 14.75                                                       | -5.789                                                     | 0.942                                                         | 0.000                                                                 | 0.942                                                                   | -0.040                                                                       |
|                              | 106                   | 03 : 22 : 34         | 12195                                                              | 10.98                                                       | -5.868                                                     | 0.832                                                         | 0.000                                                                 | 0.832                                                                   | -0.042                                                                       |
|                              | 106                   | 16 : 52 : 41         | 13005                                                              | 8.80                                                        | -5.584                                                     | 0.734                                                         | 0.000                                                                 | 0.734                                                                   | -0.038                                                                       |
| UE                           | 107                   | 06 : 22 : 46         | 13815                                                              | 6.17                                                        | -5.462                                                     | 0.618                                                         | 0.000                                                                 | 0.618                                                                   | -0.045                                                                       |
|                              | 107                   | 06 : 52 : 46         | 13845                                                              | 5.66                                                        | -5.543                                                     | 0.611                                                         | 0.000                                                                 | 0.611                                                                   | -0.076                                                                       |
|                              | 107                   | 10 : 52 : 48         | 14086                                                              | 11.82                                                       | -3.807                                                     | 0.661                                                         | 0.000                                                                 | 0.661                                                                   | 0.065                                                                        |
|                              | 107                   | 12 : 09 : 59         | 14163                                                              | 16.40                                                       | -2.305                                                     | 0.699                                                         | 0.000                                                                 | 0.699                                                                   | 0.154                                                                        |
|                              | 107                   | 13 : 30 : 01         | 14243                                                              | 21.48                                                       | 0.639                                                      | 0.752                                                         | 0.000                                                                 | 0.752                                                                   | 0.206                                                                        |
|                              | 107                   | 14 : 50 : 03         | 14323                                                              | 26.42                                                       | 4.641                                                      | 0.805                                                         | 0.000                                                                 | 0.805                                                                   | 0.209                                                                        |
|                              | 107                   | 16 : 10 : 04         | 14403                                                              | 31.69                                                       | 9.224                                                      | 0.856                                                         | 0.000                                                                 | 0.856                                                                   | 0.199                                                                        |
|                              | 107                   | 17 : 30 : 05         | 14483                                                              | 37.14                                                       | 13.900                                                     | 0.907                                                         | 0.000                                                                 | 0.907                                                                   | 0.199                                                                        |
| US                           | 107                   | 18 : 50 : 07         | 14563                                                              | 42.55                                                       | 18.232                                                     | 0.958                                                         | 0.000                                                                 | 0.958                                                                   | 0.198                                                                        |
|                              | 107                   | 20 : 10 : 08         | 14643                                                              | 48.07                                                       | 22.227                                                     | 1.008                                                         | 0.000                                                                 | 1.008                                                                   | 0.198                                                                        |
|                              | 107                   | 21 : 30 : 09         | 14723                                                              | 53.38                                                       | 25.840                                                     | 1.059                                                         | 0.000                                                                 | 1.059                                                                   | 0.198                                                                        |
|                              | 107                   | 22 : 50 : 10         | 14803                                                              | 58.78                                                       | 29.122                                                     | 1.108                                                         | 0.000                                                                 | 1.108                                                                   | 0.192                                                                        |
|                              | 108                   | 00 : 10 : 11         | 14883                                                              | 64.29                                                       | 32.041                                                     | 1.158                                                         | 0.000                                                                 | 1.158                                                                   | 0.195                                                                        |
|                              | 108                   | 01 : 30 : 14         | 14963                                                              | 69.96                                                       | 34.523                                                     | 1.208                                                         | 0.000                                                                 | 1.208                                                                   | 0.194                                                                        |
|                              | 108                   | 02 : 50 : 15         | 15043                                                              | 75.43                                                       | 36.672                                                     | 1.258                                                         | 0.000                                                                 | 1.258                                                                   | 0.194                                                                        |
|                              | 108                   | 04 : 10 : 16         | 15123                                                              | 81.09                                                       | 38.726                                                     | 1.311                                                         | 0.000                                                                 | 1.311                                                                   | 0.210                                                                        |
|                              | 108                   | 05 : 30 : 17         | 15203                                                              | 86.81                                                       | 40.454                                                     | 1.362                                                         | 0.000                                                                 | 1.362                                                                   | 0.198                                                                        |
|                              | 108                   | 06 : 50 : 18         | 15283                                                              | 92.48                                                       | 41.799                                                     | 1.411                                                         | 0.000                                                                 | 1.411                                                                   | 0.193                                                                        |
|                              | 108                   | 08 : 10 : 20         | 15363                                                              | 98.52                                                       | 42.948                                                     | 1.460                                                         | 0.000                                                                 | 1.460                                                                   | 0.192                                                                        |
|                              | 108                   | 09 : 30 : 21         | 15443                                                              | 104.57                                                      | 43.920                                                     | 1.511                                                         | 0.000                                                                 | 1.511                                                                   | 0.198                                                                        |
|                              | 108                   | 10 : 50 : 22         | 15523                                                              | 110.28                                                      | 44.436                                                     | 1.561                                                         | 0.000                                                                 | 1.561                                                                   | 0.196                                                                        |
|                              | 108                   | 12 : 10 : 25         | 15603                                                              | 116.20                                                      | 45.152                                                     | 1.610                                                         | 0.000                                                                 | 1.610                                                                   | 0.189                                                                        |
|                              | 108                   | 13 : 30 : 26         | 15683                                                              | 122.25                                                      | 46.154                                                     | 1.658                                                         | 0.000                                                                 | 1.658                                                                   | 0.190                                                                        |
|                              | 108                   | 14 : 50 : 28         | 15763                                                              | 128.15                                                      | 46.971                                                     | 1.707                                                         | 0.000                                                                 | 1.707                                                                   | 0.191                                                                        |
| UE                           | 108                   | 15 : 07 : 30         | 15780                                                              | 129.35                                                      | 47.088                                                     | 1.719                                                         | 0.000                                                                 | 1.719                                                                   | 0.214                                                                        |
|                              | 108                   | 15 : 10 : 28         | 15783                                                              | 129.01                                                      | 46.846                                                     | 1.721                                                         | 0.000                                                                 | 1.721                                                                   | 0.202                                                                        |
|                              | 108                   | 22 : 10 : 35         | 16203                                                              | 85.46                                                       | 7.889                                                      | 1.699                                                         | 0.000                                                                 | 1.699                                                                   | -0.016                                                                       |
|                              | 109                   | 05 : 10 : 45         | 16623                                                              | 59.81                                                       | -0.699                                                     | 1.616                                                         | 0.000                                                                 | 1.616                                                                   | -0.062                                                                       |
|                              | 109                   | 12 : 10 : 53         | 17044                                                              | 41.83                                                       | -4.540                                                     | 1.501                                                         | 0.000                                                                 | 1.501                                                                   | -0.085                                                                       |
|                              | 109                   | 19 : 11 : 02         | 17464                                                              | 28.82                                                       | -6.682                                                     | 1.369                                                         | 0.000                                                                 | 1.369                                                                   | -0.098                                                                       |
|                              | 110                   | 02 : 11 : 10         | 17884                                                              | 18.96                                                       | -8.001                                                     | 1.218                                                         | 0.000                                                                 | 1.218                                                                   | -0.113                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-8 ☒ Undisturbed or; ☐ Reconstituted - Specimen. File Name: B-2359\_UD5  
 Task No.: NA Date, Start: 4/5/2008 Back Pressure,  $U_{b,CS}$  (psi): 71.5 Piston Uplift,  $P_{up}$  (lbf): 35.12  
 Project Name: Exelon (Victoria) Completed: 4/21/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5  
 4186-06-Summary of Methods: NA ☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

Final Description of Specimen: Pale Brown Fat CLAY (CH)

Ring No.: 8 Area,  $A_r$  (cm<sup>2</sup>): 31.686 Solids Ht.,  $H_s$  (mm): 12.112 Specific Gravity,  $G_s =$  2.710 ☒ Meas.; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.18 Water 21.0 Void 0.583 Deg. of 97.5 Total Unit 129.0 Dry Unit 106.7  
**Final:** (mm):  $H_f$ : 18.95 Content,  $w$  (%): 21.3 Ratio,  $e$ : 0.564 Sat.,  $S$  (%): 102.1 Weight,  $\gamma_t$  (pcf): 130.9 Weight,  $\gamma_d$  (pcf): 108.0

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to errati
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed By: HP *HP*

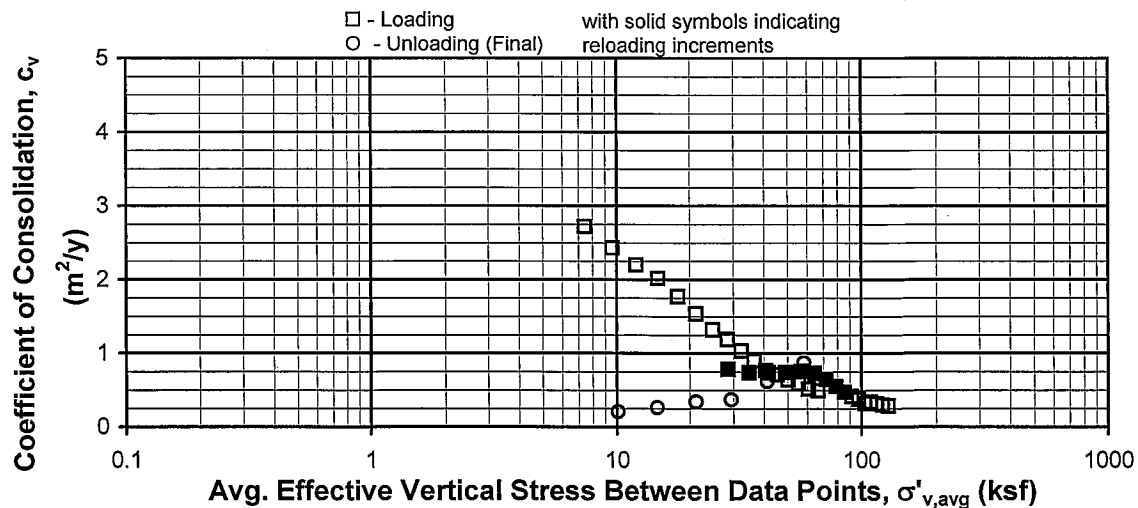
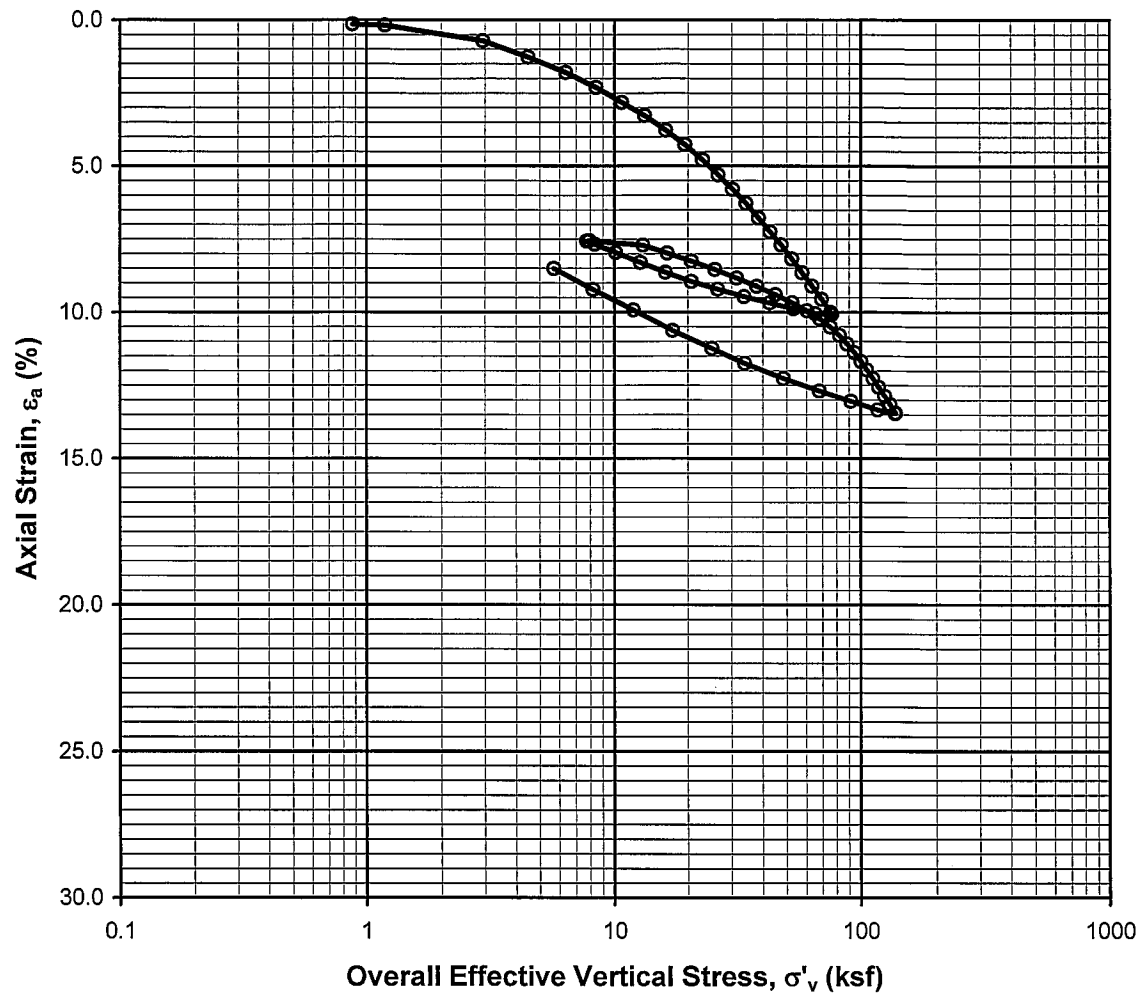
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$C_v \cdot t_n \cdot UCF$<br>$T_v \cdot (H_{c,avg})^2$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                  |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                             |                                    | 0.41                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                  |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.21                                                                                                                        | 0.580                              | 2.45                                                    |                                                                |                                                                                         | 19.136                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                  |                                                                                                       |
| BE                           |                                                                          | 5.53                                                                    | 0.12                                                                                                                        | 0.581                              | 5.53                                                    | 0.000                                                          | 0.0                                                                                     | 19.153                                                |                                                                           |                                                                     | 0.581                                  |                                                   |                                                                                                  |                                                                                                       |
| CS                           | 0                                                                        | 5.53                                                                    | 0.11                                                                                                                        | 0.581                              | 5.53                                                    | 0.000                                                          | 0.0                                                                                     | 19.154                                                |                                                                           |                                                                     | 0.581                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 97                                                                       | 8.69                                                                    | 0.44                                                                                                                        | 0.576                              | 10.28                                                   | 2.295                                                          | 22.3                                                                                    | 19.091                                                | 7.11                                                                      |                                                                     | 0.579                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 254                                                                      | 9.70                                                                    | 0.66                                                                                                                        | 0.573                              | 12.38                                                   | 3.802                                                          | 30.7                                                                                    | 19.049                                                | 9.19                                                                      |                                                                     | 0.574                                  |                                                   |                                                                                                  |                                                                                                       |
| US                           | 554                                                                      | 12.15                                                                   | 1.07                                                                                                                        | 0.566                              | 15.88                                                   | 5.247                                                          | 33.0                                                                                    | 18.970                                                | 10.93                                                                     |                                                                     | 0.569                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 854                                                                      | 15.10                                                                   | 1.48                                                                                                                        | 0.560                              | 19.36                                                   | 6.027                                                          | 31.1                                                                                    | 18.892                                                | 13.62                                                                     |                                                                     | 0.563                                  |                                                   | 0.51                                                                                             |                                                                                                       |
|                              | 1154                                                                     | 18.30                                                                   | 1.89                                                                                                                        | 0.553                              | 22.87                                                   | 6.512                                                          | 28.5                                                                                    | 18.814                                                | 16.70                                                                     |                                                                     | 0.557                                  |                                                   | 0.95                                                                                             |                                                                                                       |
|                              | 1454                                                                     | 21.76                                                                   | 2.30                                                                                                                        | 0.547                              | 26.56                                                   | 6.870                                                          | 25.9                                                                                    | 18.735                                                | 20.03                                                                     | 0.15                                                                | 0.550                                  | 4.11E-05                                          | 1.42                                                                                             |                                                                                                       |
|                              | 1754                                                                     | 25.49                                                                   | 2.70                                                                                                                        | 0.540                              | 30.53                                                   | 7.246                                                          | 23.7                                                                                    | 18.659                                                | 23.62                                                                     | 0.15                                                                | 0.544                                  | 3.71E-05                                          | 1.96                                                                                             |                                                                                                       |
|                              | 2054                                                                     | 29.10                                                                   | 3.09                                                                                                                        | 0.534                              | 34.39                                                   | 7.624                                                          | 22.2                                                                                    | 18.583                                                | 27.29                                                                     | 0.14                                                                | 0.537                                  | 3.43E-05                                          | 2.29                                                                                             |                                                                                                       |
|                              | 2354                                                                     | 32.88                                                                   | 3.49                                                                                                                        | 0.528                              | 38.60                                                   | 8.254                                                          | 21.4                                                                                    | 18.506                                                | 30.99                                                                     | 0.14                                                                | 0.531                                  | 3.26E-05                                          | 2.82                                                                                             |                                                                                                       |
|                              | 2654                                                                     | 36.63                                                                   | 3.89                                                                                                                        | 0.522                              | 42.75                                                   | 8.844                                                          | 20.7                                                                                    | 18.430                                                | 34.75                                                                     | 0.13                                                                | 0.525                                  | 2.97E-05                                          | 3.03                                                                                             |                                                                                                       |
|                              | 2954                                                                     | 40.45                                                                   | 4.28                                                                                                                        | 0.515                              | 46.86                                                   | 9.274                                                          | 19.8                                                                                    | 18.355                                                | 38.54                                                                     | 0.12                                                                | 0.518                                  | 2.70E-05                                          | 3.25                                                                                             |                                                                                                       |
|                              | 3254                                                                     | 44.48                                                                   | 4.68                                                                                                                        | 0.509                              | 51.29                                                   | 9.864                                                          | 19.2                                                                                    | 18.278                                                | 42.47                                                                     | 0.12                                                                | 0.512                                  | 2.63E-05                                          | 3.75                                                                                             |                                                                                                       |
|                              | 3554                                                                     | 48.39                                                                   | 5.07                                                                                                                        | 0.503                              | 55.71                                                   | 10.613                                                         | 19.1                                                                                    | 18.204                                                | 46.43                                                                     | 0.11                                                                | 0.506                                  | 2.33E-05                                          | 3.89                                                                                             |                                                                                                       |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

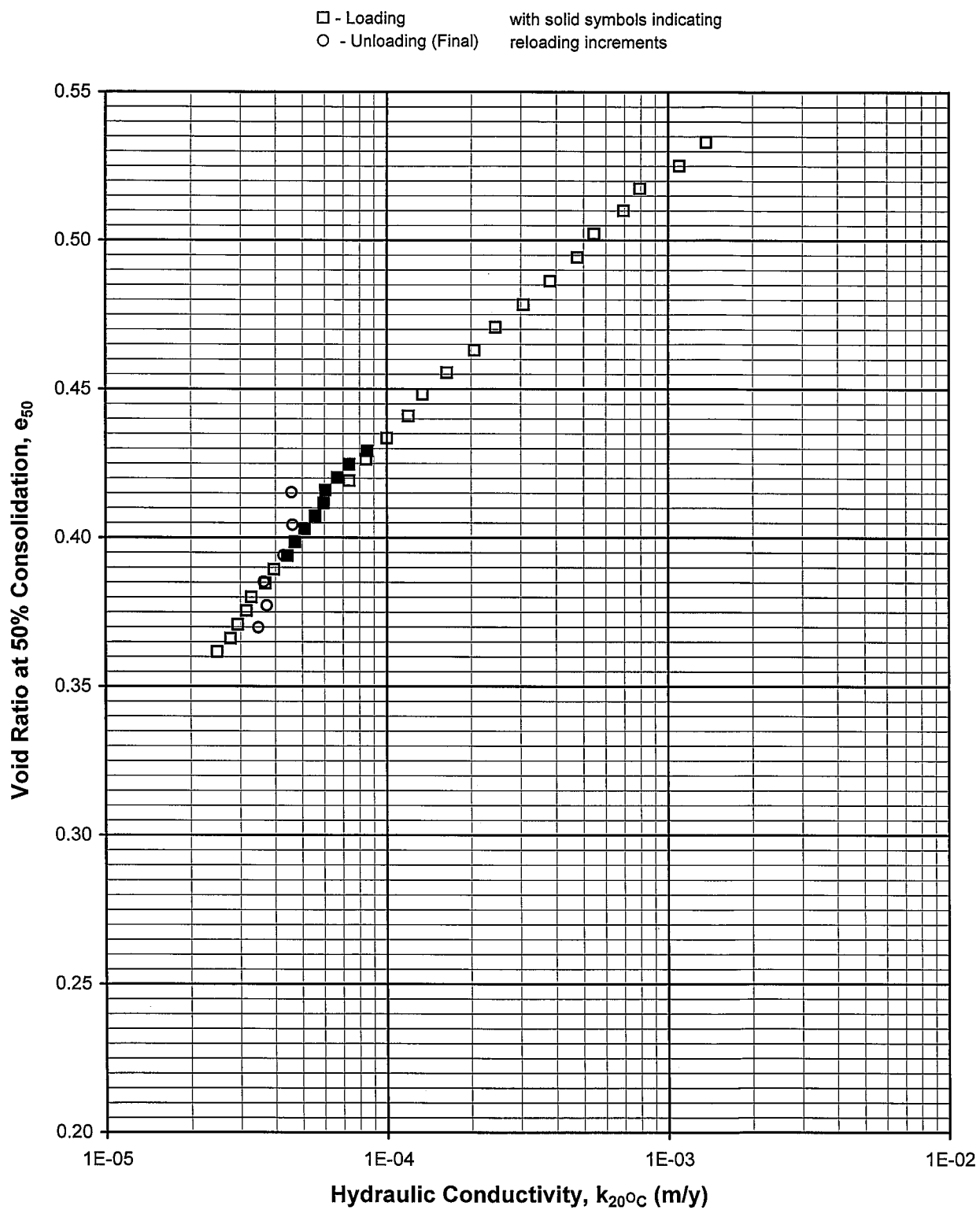
| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                             |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha = \Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>( $m^2/y$ ) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                |                                                                                                  |
|                              | 3854                                                                     | 51.99                                                                   | 5.43                                                                                                                  | 0.497                              | 60.04                                                   | 11.660                                                         | 19.4                                                                                    | 18.135                                                | 50.19                                                                     | 0.10                                                        | 0.500                                  | 1.96E-05                                          | 3.85                                                                                           |                                                                                                  |
|                              | 4154                                                                     | 56.48                                                                   | 5.85                                                                                                                  | 0.491                              | 64.75                                                   | 12.005                                                         | 18.5                                                                                    | 18.055                                                | 54.23                                                                     | 0.10                                                        | 0.494                                  | 2.15E-05                                          | 4.32                                                                                           |                                                                                                  |
| UE                           | 4454                                                                     | 61.39                                                                   | 6.24                                                                                                                  | 0.484                              | 69.52                                                   | 11.831                                                         | 17.0                                                                                    | 17.980                                                | 58.93                                                                     | 0.10                                                        | 0.488                                  | 1.98E-05                                          | 4.73                                                                                           |                                                                                                  |
|                              | 4755                                                                     | 65.56                                                                   | 6.58                                                                                                                  | 0.479                              | 74.72                                                   | 13.303                                                         | 17.8                                                                                    | 17.915                                                | 63.48                                                                     |                                                             | 0.482                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5055                                                                     | 69.89                                                                   | 6.96                                                                                                                  | 0.473                              | 80.02                                                   | 14.700                                                         | 18.4                                                                                    | 17.841                                                | 67.73                                                                     |                                                             | 0.476                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5355                                                                     | 74.69                                                                   | 7.34                                                                                                                  | 0.467                              | 85.43                                                   | 15.591                                                         | 18.3                                                                                    | 17.769                                                | 72.29                                                                     |                                                             | 0.470                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5655                                                                     | 79.38                                                                   | 7.68                                                                                                                  | 0.462                              | 90.64                                                   | 16.346                                                         | 18.0                                                                                    | 17.703                                                | 77.04                                                                     |                                                             | 0.464                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5697                                                                     | 80.06                                                                   | 7.76                                                                                                                  | 0.460                              | 91.44                                                   | 16.531                                                         | 18.1                                                                                    | 17.689                                                | 79.72                                                                     |                                                             | 0.461                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 5715                                                                     | 79.89                                                                   | 7.76                                                                                                                  | 0.460                              | 90.95                                                   | 16.079                                                         | 17.7                                                                                    | 17.687                                                | 79.97                                                                     |                                                             | 0.460                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 6525                                                                     | 66.33                                                                   | 7.61                                                                                                                  | 0.463                              | 67.29                                                   | 1.439                                                          | 2.1                                                                                     | 17.717                                                | 73.11                                                                     |                                                             | 0.462                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 7335                                                                     | 53.13                                                                   | 7.31                                                                                                                  | 0.467                              | 51.99                                                   | -1.713                                                         | -3.3                                                                                    | 17.774                                                | 59.73                                                                     |                                                             | 0.465                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 8145                                                                     | 42.88                                                                   | 6.90                                                                                                                  | 0.474                              | 40.83                                                   | -3.121                                                         | -7.6                                                                                    | 17.852                                                | 48.00                                                                     |                                                             | 0.471                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 8955                                                                     | 34.89                                                                   | 6.45                                                                                                                  | 0.481                              | 32.04                                                   | -4.380                                                         | -13.7                                                                                   | 17.939                                                | 38.89                                                                     |                                                             | 0.477                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 9765                                                                     | 28.23                                                                   | 5.97                                                                                                                  | 0.489                              | 24.98                                                   | -5.037                                                         | -20.2                                                                                   | 18.031                                                | 31.56                                                                     | 0.17                                                        | 0.485                                  | 2.14E-05                                          | 1.63                                                                                           |                                                                                                  |
|                              | 10575                                                                    | 22.87                                                                   | 5.45                                                                                                                  | 0.497                              | 19.37                                                   | -5.486                                                         | -28.3                                                                                   | 18.131                                                | 25.55                                                                     | 0.13                                                        | 0.493                                  | 2.07E-05                                          | 2.39                                                                                           |                                                                                                  |
|                              | 11385                                                                    | 18.39                                                                   | 4.91                                                                                                                  | 0.505                              | 14.75                                                   | -5.789                                                         | -39.2                                                                                   | 18.234                                                | 20.63                                                                     | 0.10                                                        | 0.501                                  | 2.00E-05                                          | 2.86                                                                                           |                                                                                                  |
|                              | 12195                                                                    | 14.60                                                                   | 4.34                                                                                                                  | 0.514                              | 10.98                                                   | -5.868                                                         | -53.5                                                                                   | 18.344                                                | 16.50                                                                     | 0.09                                                        | 0.510                                  | 2.05E-05                                          | 3.16                                                                                           |                                                                                                  |
|                              | 13005                                                                    | 12.21                                                                   | 3.83                                                                                                                  | 0.523                              | 8.80                                                    | -5.584                                                         | -63.4                                                                                   | 18.442                                                | 13.41                                                                     | 0.05                                                        | 0.519                                  | 1.88E-05                                          | 2.42                                                                                           |                                                                                                  |
| UE                           | 13815                                                                    | 9.42                                                                    | 3.23                                                                                                                  | 0.532                              | 6.17                                                    | -5.462                                                         | -88.5                                                                                   | 18.558                                                | 10.81                                                                     | 0.07                                                        | 0.527                                  | 2.28E-05                                          | 3.86                                                                                           |                                                                                                  |
|                              | 13845                                                                    | 8.93                                                                    | 3.19                                                                                                                  | 0.533                              | 5.66                                                    | -5.543                                                         | -97.9                                                                                   | 18.565                                                | 9.17                                                                      |                                                             | 0.532                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14086                                                                    | 14.24                                                                   | 3.45                                                                                                                  | 0.529                              | 11.82                                                   | -3.807                                                         | -32.2                                                                                   | 18.515                                                | 11.58                                                                     |                                                             | 0.531                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14163                                                                    | 17.90                                                                   | 3.65                                                                                                                  | 0.525                              | 16.40                                                   | -2.305                                                         | -14.1                                                                                   | 18.477                                                | 16.07                                                                     |                                                             | 0.527                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14243                                                                    | 21.05                                                                   | 3.92                                                                                                                  | 0.521                              | 21.48                                                   | 0.639                                                          | 3.0                                                                                     | 18.424                                                | 19.48                                                                     |                                                             | 0.523                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14323                                                                    | 23.23                                                                   | 4.20                                                                                                                  | 0.517                              | 26.42                                                   | 4.641                                                          | 17.6                                                                                    | 18.371                                                | 22.14                                                                     |                                                             | 0.519                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14403                                                                    | 25.19                                                                   | 4.47                                                                                                                  | 0.512                              | 31.69                                                   | 9.224                                                          | 29.1                                                                                    | 18.320                                                | 24.21                                                                     |                                                             | 0.515                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14483                                                                    | 27.17                                                                   | 4.73                                                                                                                  | 0.508                              | 37.14                                                   | 13.900                                                         | 37.4                                                                                    | 18.269                                                | 26.18                                                                     |                                                             | 0.510                                  |                                                   |                                                                                                |                                                                                                  |
| US                           | 14563                                                                    | 29.31                                                                   | 4.99                                                                                                                  | 0.504                              | 42.55                                                   | 18.232                                                         | 42.8                                                                                    | 18.218                                                | 28.24                                                                     |                                                             | 0.506                                  |                                                   |                                                                                                |                                                                                                  |
|                              | 14643                                                                    | 31.78                                                                   | 5.26                                                                                                                  | 0.500                              | 48.07                                                   | 22.227                                                         | 46.2                                                                                    | 18.168                                                | 30.55                                                                     |                                                             | 0.502                                  |                                                   | 0.21                                                                                           |                                                                                                  |
|                              | 14723                                                                    | 34.33                                                                   | 5.52                                                                                                                  | 0.496                              | 53.38                                                   | 25.840                                                         | 48.4                                                                                    | 18.117                                                | 33.06                                                                     |                                                             | 0.498                                  |                                                   | 0.33                                                                                           |                                                                                                  |
|                              | 14803                                                                    | 37.25                                                                   | 5.78                                                                                                                  | 0.492                              | 58.78                                                   | 29.122                                                         | 49.5                                                                                    | 18.068                                                | 35.79                                                                     |                                                             | 0.494                                  |                                                   | 0.43                                                                                           |                                                                                                  |

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**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-10A - Depth 70.0 - 71.5 ft  
Boring B-2359UD



**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-10A - Depth 70.0 - 71.5 ft  
 Boring B-2359UD



# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2359\_UD10a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas.; ☐ Assumed Ring No.: 17  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.682  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                                          |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lbf) =                                      | No. Layers =            |
| Sample No.: UD-10                                  | Compostite No.:                           |                                |                                   | Pluviated:                       | Tamper Force (lbf) =                                     | Drop (in.) =            |
| Depth (ft): 70.0 - 71.5                            | Specimen No.: A                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: $U_{nl}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                 | Initial - Trimming Location                              |                         |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial            | Final  |
|------------------------------------|----------------------------------------------------------|-------------------------|------------|---------------------------------------|------------------------------------------------------------|--------------------|--------|
|                                    | Top (W1)                                                 | Bottom (W2)             | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 343.63             | 341.28 |
| Container No.                      | 169                                                      | 2007                    | 2025       | 893                                   | Mass Ring (g)                                              | 217.42             |        |
| Mass Moist Soil + Container (g)    | 137.07                                                   | 124.91                  | 108.27     | 66.65                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 126.21             | 123.86 |
| Mass Dry Soil + Container (g)      | 121.29                                                   | 111.49                  | 97.24      | 61.94                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |                    |        |
| Mass Container (g)                 | 30.02                                                    | 30.46                   | 30.75      | 32.28                                 | Container No.                                              |                    | 912    |
| WATER CONTENT (%)                  | 17.29                                                    | 16.56                   | 16.59      | 15.88                                 | Mass Dry Soil + Container (g)                              |                    | 31.73  |
| Avg. Initial Water Content, W4 (%) | 16.81                                                    | Final W <sub>at</sub> : | X          | Slice ;                               | Whole Spec.                                                | Mass Container (g) | 31.72  |
|                                    | See attached data sheet(s) for additional water contents |                         |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |                    | 0.01   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                        |                                           |                             | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                        | Final                                     |                             | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 0.000  |
| with Spec.                                                                                                                                                                   | without Spec.                          | with Spec.                                | without Spec.               | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 19.260                                                                                                                                                                       | 0.000                                  | 24.380                                    | 6.540                       | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 19.238  | 24.438 |
| 19.230                                                                                                                                                                       | 0.000                                  | 24.410                                    | 6.540                       | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 6.562  |
| 19.230                                                                                                                                                                       | 0.000                                  | 24.340                                    | 6.570                       | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 19.238  | 17.876 |
| 19.220                                                                                                                                                                       | 0.000                                  | 24.320                                    | 6.580                       | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 19.250                                                                                                                                                                       | 0.000                                  | 24.740                                    | 6.580                       | Initial Height, $H_o$                                   |                                                                     | 19.238  |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ | 1.636   |        |
| <input type="checkbox"/> Yes ;                                                                                                                                               | <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; | <input type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$           | 17.602  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                        |                                           |                             |                                                         | Final Soil Height Measurement, $H_{f,m}$                            | 17.876  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                        |                                           |                             |                                                         | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               | -1.43   |        |

| Estimated Initial Unit Weight                                          |                                |                             |        | Soil Extruded During Loading                            |      |
|------------------------------------------------------------------------|--------------------------------|-----------------------------|--------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                          | 129.27                         | Dry, $\gamma_{d,o}$ (pcf) = | 110.66 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; | <input type="checkbox"/> Other |                             |        | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ;         | <input type="checkbox"/> No    |                             |        | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ;          | <input type="checkbox"/> No    |                             |        | Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Light Gray and Yellowish Brown Fat CLAY (CH)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 3/26/2008 Date: 3/26/2008 Final Calc. By: LF Date: 4/1/2008  
 Reviewed By: HP *HP*

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2359\_UD10a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 17.29                    | 107.61                   | 87.4                         | 95.8                  | 100.9 |
| 2                | " Bottom, W2          | 16.56                    | 108.28                   | 85.3                         | 93.2                  | 98.3  |
| 3                | " Sides, W3           | 16.59                    | 108.25                   | 85.3                         | 93.3                  | 98.4  |
| 4                | " Average, W4         | 16.81                    | 108.04                   | 86.0                         | 94.1                  | 99.2  |
| 5                | " Back Calculated (1) | 18.07                    | 106.90 (3)               | 89.7                         | 98.4                  | 103.7 |
| 6                | Final                 | 15.88                    | 106.90 (2)               | 89.7                         | 98.4                  | 103.7 |

## Calculated Specific Gravity for Final Saturation = 100%:

Used Cal. Routine No. 5 to obtain the mass of dry soil  
 and final height by: ☒ Measurement; ☐ Dial Change.  
 Back Cal.  $G_s$  = 2.702  
 Avg.  $G_s$  (measured/assumed) & Back Cal.  $G_s$  = 2.711

## Calculation Constant, K

= (unit conversion) /  $G_s \times \rho_w \times A_r$

|                       |         |
|-----------------------|---------|
| Estimated, $K_e$      | 0.11625 |
| Final Selected, $K_f$ | 0.11625 |

## Calculated Mass Dry Soil for Final Saturation = 100%:

using measured/assumed  $G_s$   
 and final height by: ☒ Measurement; ☐ Dial Change.  
 Back Cal. Mass Dry Soil, (g) = 106.47  
 Avg. Back Calculated and Measured Mass Dry Soil (g) = 106.68

## Summary of Specimen Physical Properties

|                       |                      |               |                             |                                     |                                                                |                                                  |                                                                        |                         |
|-----------------------|----------------------|---------------|-----------------------------|-------------------------------------|----------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|-------------------------|
| Specific Gravity      |                      |               | Assumed                     |                                     | To make $S_r = 100\%$ at end of test.                          |                                                  |                                                                        |                         |
| $G_s = 2.720$         |                      |               | X                           | Measured                            | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_r = 100\%$ |                                                  |                                                                        |                         |
| Mass Dry Soil, (g)    | Initial: 106.90      |               | X                           | From Cal. Routine No.               | 5                                                              | Note: Routine #5 is based on final measurements. |                                                                        |                         |
|                       | Final (4): NA        |               |                             | Make $S_r = 100\%$ , or;            |                                                                | Avg. of measured & make $S_r = 100\%$            |                                                                        |                         |
| Initial Height (mm) = |                      |               | 19.24                       | X                                   | Measured ;                                                     |                                                  | Back Calculated                                                        | Back-cal. Sat. (%) = NA |
| Final Height (mm) =   |                      |               | 17.88                       | X                                   | Measured ;                                                     |                                                  | Initial $H_o$ & dial change during loading                             |                         |
|                       | Water Content, w (%) | Void Ratio, e | Degree of Saturation, S (%) | Total Unit Weight, $\gamma_t$ (pcf) | Dry Unit Weight, $\gamma_d$ (pcf)                              | Height of Solids, $H_s$ (2,4) (mm)               | Extruded soil loss proportioned in increasing loading increments (5) : |                         |
| Initial               | 18.1                 | 0.548         | 89.7                        | 129.3                               | 109.5                                                          | 12.427                                           | From                                                                   | To (ksf)                |
| Final                 | 15.9                 | 0.438         | 98.4                        | 136.5                               | 117.8                                                          | NA                                               | NA                                                                     | NA                      |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 95 | Minus 200 (%) |
| Casagrande Method      | 26.10             | NA                                | 0.125 | 0.035 | 3.4 | Plastic Limit (PL)    | 34 | 96.0          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 61 |               |

NA - Indicates not applicable

## Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP

Date: 4/2/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2359\_UD10a  
 Task No.: NA Date; Start: 3/26/2008 Initial Height,  $H_o$  (mm): 19.24  
 Project Name: Exelon (Victoria) Completed: 4/1/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.6819  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b, BE}$  (psi): 70.08127,  $V$ : 0.023043767 Piston Uplift,  $P_{up}$  (lbf): 34.90  
 Back Pressure,  $U_{b, CS}$  (psi): 71.02222,  $V$ : 0.023355052 Setup  $DT_{ref}$  (V): 0.001011943  
 Displacement Transducer No.: DT-100 Calib. Factor (mm/V): 376.22281 Ch. No.: 2  
 Pore Press. Transducer No.: PT-124 Calib. Factor (psi/V): 3022.80878 Ref. Zero (V): -0.000140 Ch. No.: 3  
 Force Cell No.: FT-109 Calib. Factor (lbf/V): -154608.61 Ref. Zero (V): -0.001436 Ch. No.: 1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S                            | 86                    | 13 : 38 : 11         |                                                                    | 0.12                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                              |
| BS                           | 86                    | 13 : 54 : 45         |                                                                    | 0.64                                                        |                                                            | 0.039                                                         | 0.000                                                                 | 0.039                                                                   |                                                                              |
| BE                           | 87                    | 09 : 47 : 20         |                                                                    | 0.79                                                        | -0.135                                                     | 0.028                                                         | 0.000                                                                 | 0.028                                                                   |                                                                              |
| CS                           | 87                    | 09 : 54 : 50         | 0                                                                  | 1.18                                                        | 0.000                                                      | 0.033                                                         | 0.000                                                                 | 0.033                                                                   |                                                                              |
|                              | 87                    | 11 : 24 : 53         | 90                                                                 | 3.15                                                        | 0.316                                                      | 0.136                                                         | 0.000                                                                 | 0.136                                                                   | 0.356                                                                        |
|                              | 87                    | 12 : 54 : 54         | 180                                                                | 4.82                                                        | 0.519                                                      | 0.243                                                         | 0.000                                                                 | 0.243                                                                   | 0.372                                                                        |
| US                           | 87                    | 14 : 24 : 55         | 270                                                                | 6.85                                                        | 0.723                                                      | 0.346                                                         | 0.000                                                                 | 0.346                                                                   | 0.355                                                                        |
|                              | 87                    | 15 : 54 : 56         | 360                                                                | 9.06                                                        | 0.888                                                      | 0.444                                                         | 0.000                                                                 | 0.444                                                                   | 0.341                                                                        |
|                              | 87                    | 17 : 24 : 59         | 450                                                                | 11.51                                                       | 1.087                                                      | 0.542                                                         | 0.000                                                                 | 0.542                                                                   | 0.339                                                                        |
|                              | 87                    | 18 : 55 : 01         | 540                                                                | 14.25                                                       | 1.340                                                      | 0.630                                                         | 0.000                                                                 | 0.630                                                                   | 0.304                                                                        |
|                              | 87                    | 20 : 25 : 03         | 630                                                                | 17.42                                                       | 1.679                                                      | 0.726                                                         | 0.000                                                                 | 0.726                                                                   | 0.334                                                                        |
|                              | 87                    | 21 : 55 : 05         | 720                                                                | 20.90                                                       | 2.051                                                      | 0.821                                                         | 0.000                                                                 | 0.821                                                                   | 0.327                                                                        |
|                              | 87                    | 23 : 25 : 07         | 810                                                                | 24.60                                                       | 2.467                                                      | 0.922                                                         | 0.000                                                                 | 0.922                                                                   | 0.349                                                                        |
|                              | 88                    | 00 : 55 : 08         | 900                                                                | 28.43                                                       | 2.918                                                      | 1.019                                                         | 0.000                                                                 | 1.019                                                                   | 0.338                                                                        |
|                              | 88                    | 02 : 25 : 09         | 990                                                                | 32.66                                                       | 3.569                                                      | 1.114                                                         | 0.000                                                                 | 1.114                                                                   | 0.330                                                                        |
|                              | 88                    | 03 : 55 : 11         | 1080                                                               | 37.20                                                       | 4.339                                                      | 1.208                                                         | 0.000                                                                 | 1.208                                                                   | 0.324                                                                        |
|                              | 88                    | 05 : 25 : 13         | 1170                                                               | 42.01                                                       | 5.183                                                      | 1.303                                                         | 0.000                                                                 | 1.303                                                                   | 0.331                                                                        |
|                              | 88                    | 06 : 55 : 15         | 1260                                                               | 46.94                                                       | 6.069                                                      | 1.394                                                         | 0.000                                                                 | 1.394                                                                   | 0.313                                                                        |
|                              | 88                    | 08 : 25 : 18         | 1350                                                               | 52.38                                                       | 7.112                                                      | 1.481                                                         | 0.000                                                                 | 1.481                                                                   | 0.303                                                                        |
|                              | 88                    | 09 : 55 : 19         | 1440                                                               | 58.20                                                       | 8.294                                                      | 1.573                                                         | 0.000                                                                 | 1.573                                                                   | 0.319                                                                        |
|                              | 88                    | 11 : 25 : 21         | 1531                                                               | 64.42                                                       | 9.587                                                      | 1.664                                                         | 0.000                                                                 | 1.664                                                                   | 0.313                                                                        |
|                              | 88                    | 12 : 55 : 24         | 1621                                                               | 70.75                                                       | 10.771                                                     | 1.751                                                         | 0.000                                                                 | 1.751                                                                   | 0.303                                                                        |
| UE                           | 88                    | 14 : 25 : 25         | 1711                                                               | 77.61                                                       | 12.103                                                     | 1.838                                                         | 0.000                                                                 | 1.838                                                                   | 0.300                                                                        |
|                              | 88                    | 15 : 55 : 27         | 1801                                                               | 84.91                                                       | 13.592                                                     | 1.925                                                         | 0.000                                                                 | 1.925                                                                   | 0.301                                                                        |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 88                    | 16 : 08 : 39         | 1814                                                               | 85.98                                                       | 13.805                                                     | 1.938                                                         | 0.000                                                                 | 1.938                                                                   | 0.311                                                                        |
|                              | 88                    | 16 : 10 : 27         | 1816                                                               | 85.41                                                       | 13.662                                                     | 1.938                                                         | 0.000                                                                 | 1.938                                                                   | -0.050                                                                       |
|                              | 88                    | 18 : 25 : 30         | 1951                                                               | 65.82                                                       | 0.907                                                      | 1.932                                                         | 0.000                                                                 | 1.932                                                                   | -0.012                                                                       |
|                              | 88                    | 20 : 40 : 34         | 2086                                                               | 51.67                                                       | -2.408                                                     | 1.901                                                         | 0.000                                                                 | 1.901                                                                   | -0.072                                                                       |
|                              | 88                    | 22 : 55 : 36         | 2221                                                               | 40.55                                                       | -3.367                                                     | 1.863                                                         | 0.000                                                                 | 1.863                                                                   | -0.089                                                                       |
|                              | 89                    | 01 : 10 : 38         | 2356                                                               | 31.14                                                       | -3.860                                                     | 1.822                                                         | 0.000                                                                 | 1.822                                                                   | -0.094                                                                       |
| US                           | 89                    | 03 : 25 : 41         | 2491                                                               | 23.62                                                       | -4.208                                                     | 1.774                                                         | 0.000                                                                 | 1.774                                                                   | -0.112                                                                       |
|                              | 89                    | 05 : 40 : 44         | 2626                                                               | 17.73                                                       | -4.570                                                     | 1.722                                                         | 0.000                                                                 | 1.722                                                                   | -0.120                                                                       |
|                              | 89                    | 07 : 55 : 48         | 2761                                                               | 13.17                                                       | -4.848                                                     | 1.662                                                         | 0.000                                                                 | 1.662                                                                   | -0.138                                                                       |
|                              | 89                    | 10 : 10 : 51         | 2896                                                               | 9.73                                                        | -5.022                                                     | 1.596                                                         | 0.000                                                                 | 1.596                                                                   | -0.152                                                                       |
|                              | 89                    | 12 : 25 : 54         | 3031                                                               | 7.07                                                        | -5.097                                                     | 1.531                                                         | 0.000                                                                 | 1.531                                                                   | -0.151                                                                       |
| UE                           | 89                    | 14 : 40 : 57         | 3166                                                               | 5.56                                                        | -4.691                                                     | 1.476                                                         | 0.000                                                                 | 1.476                                                                   | -0.127                                                                       |
|                              | 89                    | 15 : 22 : 47         | 3208                                                               | 4.93                                                        | -4.756                                                     | 1.455                                                         | 0.000                                                                 | 1.455                                                                   | -0.155                                                                       |
|                              | 89                    | 15 : 25 : 58         | 3211                                                               | 5.12                                                        | -4.737                                                     | 1.454                                                         | 0.000                                                                 | 1.454                                                                   | -0.097                                                                       |
|                              | 89                    | 16 : 33 : 29         | 3279                                                               | 12.26                                                       | -1.361                                                     | 1.483                                                         | 0.000                                                                 | 1.483                                                                   | 0.131                                                                        |
|                              | 89                    | 17 : 41 : 01         | 3346                                                               | 18.64                                                       | 3.097                                                      | 1.534                                                         | 0.000                                                                 | 1.534                                                                   | 0.239                                                                        |
| US                           | 89                    | 18 : 48 : 32         | 3414                                                               | 24.93                                                       | 6.122                                                      | 1.588                                                         | 0.000                                                                 | 1.588                                                                   | 0.248                                                                        |
|                              | 89                    | 19 : 56 : 03         | 3481                                                               | 31.42                                                       | 8.239                                                      | 1.643                                                         | 0.000                                                                 | 1.643                                                                   | 0.256                                                                        |
|                              | 89                    | 21 : 03 : 34         | 3549                                                               | 38.15                                                       | 9.591                                                      | 1.700                                                         | 0.000                                                                 | 1.700                                                                   | 0.260                                                                        |
|                              | 89                    | 22 : 11 : 06         | 3616                                                               | 45.20                                                       | 10.392                                                     | 1.755                                                         | 0.000                                                                 | 1.755                                                                   | 0.255                                                                        |
|                              | 89                    | 23 : 18 : 37         | 3684                                                               | 52.63                                                       | 10.895                                                     | 1.809                                                         | 0.000                                                                 | 1.809                                                                   | 0.249                                                                        |
|                              | 90                    | 00 : 26 : 08         | 3751                                                               | 60.35                                                       | 11.248                                                     | 1.860                                                         | 0.000                                                                 | 1.860                                                                   | 0.238                                                                        |
|                              | 90                    | 01 : 33 : 40         | 3819                                                               | 68.50                                                       | 11.790                                                     | 1.914                                                         | 0.000                                                                 | 1.914                                                                   | 0.246                                                                        |
|                              | 90                    | 02 : 41 : 12         | 3886                                                               | 76.87                                                       | 12.733                                                     | 1.967                                                         | 0.000                                                                 | 1.967                                                                   | 0.246                                                                        |
|                              | 90                    | 03 : 48 : 43         | 3954                                                               | 85.02                                                       | 14.041                                                     | 2.021                                                         | 0.000                                                                 | 2.021                                                                   | 0.248                                                                        |
|                              | 90                    | 04 : 56 : 15         | 4021                                                               | 92.77                                                       | 15.552                                                     | 2.076                                                         | 0.000                                                                 | 2.076                                                                   | 0.255                                                                        |
|                              | 90                    | 06 : 03 : 46         | 4089                                                               | 100.17                                                      | 17.122                                                     | 2.134                                                         | 0.000                                                                 | 2.134                                                                   | 0.266                                                                        |
|                              | 90                    | 07 : 11 : 18         | 4156                                                               | 107.36                                                      | 18.623                                                     | 2.190                                                         | 0.000                                                                 | 2.190                                                                   | 0.262                                                                        |
|                              | 90                    | 08 : 18 : 49         | 4224                                                               | 114.47                                                      | 20.194                                                     | 2.248                                                         | 0.000                                                                 | 2.248                                                                   | 0.267                                                                        |
|                              | 90                    | 09 : 26 : 21         | 4292                                                               | 121.06                                                      | 21.351                                                     | 2.303                                                         | 0.000                                                                 | 2.303                                                                   | 0.256                                                                        |
|                              | 90                    | 10 : 33 : 51         | 4359                                                               | 128.51                                                      | 22.943                                                     | 2.360                                                         | 0.000                                                                 | 2.360                                                                   | 0.263                                                                        |
|                              | 90                    | 11 : 41 : 23         | 4427                                                               | 135.97                                                      | 24.408                                                     | 2.418                                                         | 0.000                                                                 | 2.418                                                                   | 0.264                                                                        |
|                              | 90                    | 12 : 48 : 54         | 4494                                                               | 143.53                                                      | 25.742                                                     | 2.475                                                         | 0.000                                                                 | 2.475                                                                   | 0.265                                                                        |
| UE                           | 90                    | 13 : 56 : 25         | 4562                                                               | 151.15                                                      | 27.095                                                     | 2.529                                                         | 0.000                                                                 | 2.529                                                                   | 0.252                                                                        |
|                              | 90                    | 15 : 03 : 57         | 4629                                                               | 159.00                                                      | 28.576                                                     | 2.585                                                         | 0.000                                                                 | 2.585                                                                   | 0.255                                                                        |
|                              | 90                    | 15 : 08 : 10         | 4633                                                               | 159.48                                                      | 28.678                                                     | 2.588                                                         | 0.000                                                                 | 2.588                                                                   | 0.269                                                                        |
|                              | 90                    | 15 : 11 : 27         | 4637                                                               | 158.52                                                      | 28.353                                                     | 2.588                                                         | 0.000                                                                 | 2.588                                                                   | -0.014                                                                       |
|                              | 90                    | 19 : 34 : 05         | 4899                                                               | 118.77                                                      | 1.157                                                      | 2.566                                                         | 0.000                                                                 | 2.566                                                                   | -0.027                                                                       |
|                              | 90                    | 23 : 56 : 42         | 5162                                                               | 88.65                                                       | -4.226                                                     | 2.510                                                         | 0.000                                                                 | 2.510                                                                   | -0.066                                                                       |
| US                           | 91                    | 04 : 19 : 18         | 5424                                                               | 63.60                                                       | -6.405                                                     | 2.441                                                         | 0.000                                                                 | 2.441                                                                   | -0.081                                                                       |
|                              | 91                    | 08 : 41 : 52         | 5687                                                               | 43.73                                                       | -7.504                                                     | 2.360                                                         | 0.000                                                                 | 2.360                                                                   | -0.097                                                                       |
|                              | 91                    | 13 : 04 : 28         | 5950                                                               | 28.77                                                       | -7.989                                                     | 2.262                                                         | 0.000                                                                 | 2.262                                                                   | -0.116                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-12 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2359\_UD11

Task No.: NA Date: Start: 3/26/2008 Back Pressure,  $U_{b,cs}$  (psi): 71.0 Piston Uplift,  $P_{up}$  (lbf): 34.90

Project Name: Exelon (Victoria) Completed: 4/1/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt ; in ☐ g/kg

Final Description of Specimen: Mottled Light Gray and Yellowish Brown Fat CLAY (CH)

|                                |       |                                 |        |                         |        |                           |       |                                             |                                  |
|--------------------------------|-------|---------------------------------|--------|-------------------------|--------|---------------------------|-------|---------------------------------------------|----------------------------------|
| Ring No.:                      | 17    | Area, $A_r$ (cm <sup>2</sup> ): | 31.682 | Solids Ht., $H_s$ (mm): | 12.427 | Specific Gravity, $G_s =$ | 2.720 | <input checked="" type="checkbox"/> Meas. ; | <input type="checkbox"/> Assumed |
| <b>Initial:</b> Height $H_o$ : | 19.24 | Water                           | 18.1   | Void                    | 0.548  | Deg. of                   | 89.7  | Total Unit                                  | 129.3                            |
| <b>Final:</b> (mm): $H_f$ :    | 17.88 | Content, $w$ (%):               | 15.9   | Ratio, $e$ :            | 0.438  | Sat., $S$ (%):            | 98.4  | Weight, $\gamma_t$ (pcf):                   | 136.5                            |
|                                |       |                                 |        |                         |        |                           |       | Weight, $\gamma_d$ (pcf):                   | 117.8                            |

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$C_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.12                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.20                                                                                                                  | 0.545                              | 0.64                                                    |                                                                |                                                                                         | 19.199                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                     |                                                                                                       |
| BE                           |                                                                          | 0.88                                                                    | 0.15                                                                                                                  | 0.546                              | 0.79                                                    | -0.135                                                         | -17.2                                                                                   | 19.210                                                |                                                                           |                                                                     | 0.545                                  |                                                   |                                                                                                     |                                                                                                       |
| CS                           | 0                                                                        | 1.18                                                                    | 0.17                                                                                                                  | 0.545                              | 1.18                                                    | 0.000                                                          | 0.0                                                                                     | 19.205                                                |                                                                           |                                                                     | 0.546                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 90                                                                       | 2.94                                                                    | 0.71                                                                                                                  | 0.537                              | 3.15                                                    | 0.316                                                          | 10.0                                                                                    | 19.102                                                | 2.06                                                                      |                                                                     | 0.541                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 180                                                                      | 4.47                                                                    | 1.26                                                                                                                  | 0.529                              | 4.82                                                    | 0.519                                                          | 10.8                                                                                    | 18.995                                                | 3.70                                                                      |                                                                     | 0.533                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 270                                                                      | 6.36                                                                    | 1.80                                                                                                                  | 0.520                              | 6.85                                                    | 0.723                                                          | 10.6                                                                                    | 18.892                                                | 5.41                                                                      |                                                                     | 0.524                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 360                                                                      | 8.46                                                                    | 2.31                                                                                                                  | 0.512                              | 9.06                                                    | 0.888                                                          | 9.8                                                                                     | 18.794                                                | 7.41                                                                      | 2.72                                                                | 0.516                                  | 1.37E-03                                          | 2.62                                                                                                |                                                                                                       |
|                              | 450                                                                      | 10.77                                                                   | 2.82                                                                                                                  | 0.504                              | 11.51                                                   | 1.087                                                          | 9.4                                                                                     | 18.696                                                | 9.61                                                                      | 2.43                                                                | 0.508                                  | 1.10E-03                                          | 4.73                                                                                                |                                                                                                       |
|                              | 540                                                                      | 13.35                                                                   | 3.27                                                                                                                  | 0.497                              | 14.25                                                   | 1.340                                                          | 9.4                                                                                     | 18.608                                                | 12.06                                                                     | 2.20                                                                | 0.501                                  | 7.94E-04                                          | 6.49                                                                                                |                                                                                                       |
|                              | 630                                                                      | 16.28                                                                   | 3.78                                                                                                                  | 0.490                              | 17.42                                                   | 1.679                                                          | 9.6                                                                                     | 18.512                                                | 14.82                                                                     | 2.01                                                                | 0.494                                  | 6.94E-04                                          | 8.02                                                                                                |                                                                                                       |
|                              | 720                                                                      | 19.51                                                                   | 4.27                                                                                                                  | 0.482                              | 20.90                                                   | 2.051                                                          | 9.8                                                                                     | 18.417                                                | 17.90                                                                     | 1.77                                                                | 0.486                                  | 5.44E-04                                          | 8.89                                                                                                |                                                                                                       |
|                              | 810                                                                      | 22.93                                                                   | 4.79                                                                                                                  | 0.474                              | 24.60                                                   | 2.467                                                          | 10.0                                                                                    | 18.316                                                | 21.22                                                                     | 1.53                                                                | 0.478                                  | 4.75E-04                                          | 9.35                                                                                                |                                                                                                       |
|                              | 900                                                                      | 26.45                                                                   | 5.30                                                                                                                  | 0.466                              | 28.43                                                   | 2.918                                                          | 10.3                                                                                    | 18.219                                                | 24.69                                                                     | 1.32                                                                | 0.470                                  | 3.81E-04                                          | 9.47                                                                                                |                                                                                                       |
|                              | 990                                                                      | 30.23                                                                   | 5.79                                                                                                                  | 0.458                              | 32.66                                                   | 3.569                                                          | 10.9                                                                                    | 18.124                                                | 28.34                                                                     | 1.19                                                                | 0.462                                  | 3.07E-04                                          | 9.88                                                                                                |                                                                                                       |
|                              | 1080                                                                     | 34.24                                                                   | 6.28                                                                                                                  | 0.451                              | 37.20                                                   | 4.339                                                          | 11.7                                                                                    | 18.030                                                | 32.24                                                                     | 1.03                                                                | 0.455                                  | 2.44E-04                                          | 9.75                                                                                                |                                                                                                       |
|                              | 1170                                                                     | 38.47                                                                   | 6.77                                                                                                                  | 0.443                              | 42.01                                                   | 5.183                                                          | 12.3                                                                                    | 17.935                                                | 36.36                                                                     | 0.90                                                                | 0.447                                  | 2.05E-04                                          | 9.49                                                                                                |                                                                                                       |

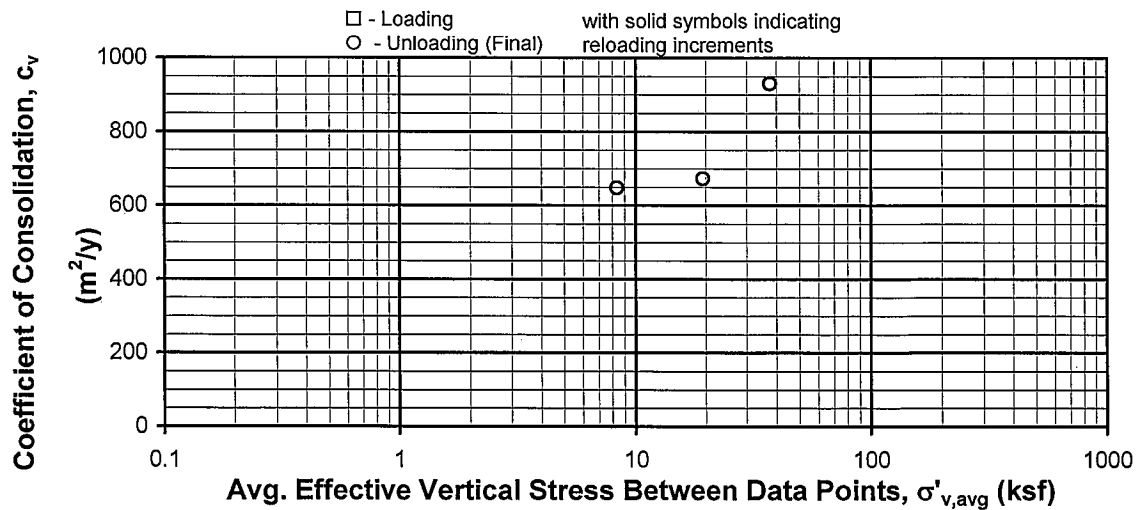
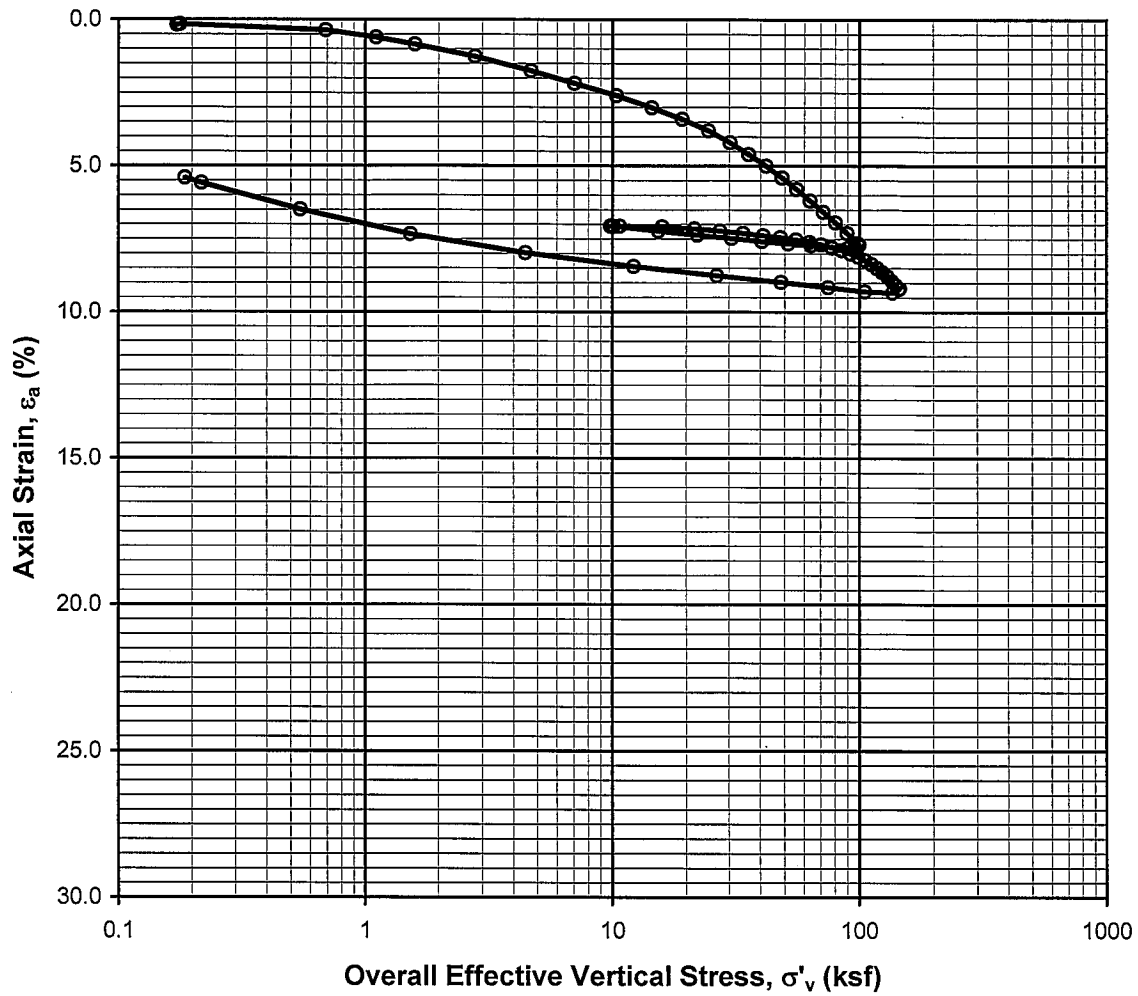
# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Loading Info.<br>(1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                             |                                                         |                               |                                          | Steady State Ratio, $SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $c_\alpha = \frac{\Delta d_{a,sc}}{H_o} (\times 10^{-4})$ |
|----------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|                      |                                                        |                                                          |                                                                                                              |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf) | Coefficient of Consolidation, $c_v$ (m <sup>2</sup> /y) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                        |
|                      | 1260                                                   | 42.80                                                    | 7.24                                                                                                         | 0.436                     | 46.94                                       | 6.069                                              | 12.9                                                                     | 17.844                                    | 40.64                                                      | 0.77                                                    | 0.440                         | 1.63E-04                                 | 9.04                                                                                  |                                                                                        |
|                      | 1350                                                   | 47.53                                                    | 7.70                                                                                                         | 0.429                     | 52.38                                       | 7.112                                              | 13.6                                                                     | 17.757                                    | 45.17                                                      | 0.71                                                    | 0.432                         | 1.34E-04                                 | 9.24                                                                                  |                                                                                        |
|                      | 1440                                                   | 52.53                                                    | 8.18                                                                                                         | 0.421                     | 58.20                                       | 8.294                                              | 14.3                                                                     | 17.665                                    | 50.03                                                      | 0.64                                                    | 0.425                         | 1.19E-04                                 | 9.12                                                                                  |                                                                                        |
|                      | 1531                                                   | 57.85                                                    | 8.65                                                                                                         | 0.414                     | 64.42                                       | 9.587                                              | 14.9                                                                     | 17.574                                    | 55.19                                                      | 0.58                                                    | 0.418                         | 9.99E-05                                 | 9.01                                                                                  |                                                                                        |
|                      | 1621                                                   | 63.37                                                    | 9.10                                                                                                         | 0.407                     | 70.75                                       | 10.771                                             | 15.2                                                                     | 17.487                                    | 60.61                                                      | 0.52                                                    | 0.411                         | 8.42E-05                                 | 8.61                                                                                  |                                                                                        |
| UE                   | 1711                                                   | 69.31                                                    | 9.55                                                                                                         | 0.400                     | 77.61                                       | 12.103                                             | 15.6                                                                     | 17.400                                    | 66.34                                                      | 0.49                                                    | 0.404                         | 7.34E-05                                 | 8.84                                                                                  |                                                                                        |
|                      | 1801                                                   | 75.59                                                    | 10.00                                                                                                        | 0.393                     | 84.91                                       | 13.592                                             | 16.0                                                                     | 17.313                                    | 72.45                                                      |                                                         | 0.397                         |                                          |                                                                                       |                                                                                        |
|                      | 1814                                                   | 76.51                                                    | 10.07                                                                                                        | 0.392                     | 85.98                                       | 13.805                                             | 16.1                                                                     | 17.300                                    | 76.05                                                      |                                                         | 0.393                         |                                          |                                                                                       |                                                                                        |
|                      | 1816                                                   | 76.04                                                    | 10.07                                                                                                        | 0.392                     | 85.41                                       | 13.662                                             | 16.0                                                                     | 17.300                                    | 76.27                                                      |                                                         | 0.392                         |                                          |                                                                                       |                                                                                        |
|                      | 1951                                                   | 65.21                                                    | 10.05                                                                                                        | 0.393                     | 65.82                                       | 0.907                                              | 1.4                                                                      | 17.306                                    | 70.63                                                      |                                                         | 0.392                         |                                          |                                                                                       |                                                                                        |
|                      | 2086                                                   | 53.26                                                    | 9.88                                                                                                         | 0.395                     | 51.67                                       | -2.408                                             | -4.7                                                                     | 17.337                                    | 59.24                                                      |                                                         | 0.394                         |                                          |                                                                                       |                                                                                        |
|                      | 2221                                                   | 42.76                                                    | 9.68                                                                                                         | 0.398                     | 40.55                                       | -3.367                                             | -8.3                                                                     | 17.375                                    | 48.01                                                      |                                                         | 0.397                         |                                          |                                                                                       |                                                                                        |
|                      | 2356                                                   | 33.66                                                    | 9.47                                                                                                         | 0.401                     | 31.14                                       | -3.860                                             | -12.4                                                                    | 17.416                                    | 38.21                                                      |                                                         | 0.400                         |                                          |                                                                                       |                                                                                        |
| US                   | 2491                                                   | 26.35                                                    | 9.22                                                                                                         | 0.405                     | 23.62                                       | -4.208                                             | -17.8                                                                    | 17.464                                    | 30.01                                                      |                                                         | 0.403                         |                                          |                                                                                       |                                                                                        |
|                      | 2626                                                   | 20.66                                                    | 8.95                                                                                                         | 0.410                     | 17.73                                       | -4.570                                             | -25.8                                                                    | 17.516                                    | 23.50                                                      | 0.89                                                    | 0.407                         | 7.26E-05                                 | 1.49                                                                                  |                                                                                        |
|                      | 2761                                                   | 16.23                                                    | 8.64                                                                                                         | 0.414                     | 13.17                                       | -4.848                                             | -36.8                                                                    | 17.576                                    | 18.44                                                      | 0.67                                                    | 0.412                         | 7.73E-05                                 | 2.23                                                                                  |                                                                                        |
|                      | 2896                                                   | 12.84                                                    | 8.30                                                                                                         | 0.420                     | 9.73                                        | -5.022                                             | -51.6                                                                    | 17.642                                    | 14.53                                                      | 0.51                                                    | 0.417                         | 8.10E-05                                 | 2.54                                                                                  |                                                                                        |
|                      | 3031                                                   | 10.15                                                    | 7.96                                                                                                         | 0.425                     | 7.07                                        | -5.097                                             | -72.1                                                                    | 17.707                                    | 11.50                                                      | 0.41                                                    | 0.422                         | 7.80E-05                                 | 2.71                                                                                  |                                                                                        |
| UE                   | 3166                                                   | 8.36                                                     | 7.67                                                                                                         | 0.429                     | 5.56                                        | -4.691                                             | -84.4                                                                    | 17.762                                    | 9.25                                                       | 0.26                                                    | 0.427                         | 6.71E-05                                 | 2.10                                                                                  |                                                                                        |
|                      | 3208                                                   | 7.74                                                     | 7.56                                                                                                         | 0.431                     | 4.93                                        | -4.756                                             | -96.4                                                                    | 17.783                                    | 8.05                                                       |                                                         | 0.430                         |                                          |                                                                                       |                                                                                        |
|                      | 3211                                                   | 7.93                                                     | 7.56                                                                                                         | 0.431                     | 5.12                                        | -4.737                                             | -92.4                                                                    | 17.784                                    | 7.83                                                       |                                                         | 0.431                         |                                          |                                                                                       |                                                                                        |
|                      | 3279                                                   | 13.15                                                    | 7.71                                                                                                         | 0.429                     | 12.26                                       | -1.361                                             | -11.1                                                                    | 17.755                                    | 10.54                                                      |                                                         | 0.430                         |                                          |                                                                                       |                                                                                        |
|                      | 3346                                                   | 16.52                                                    | 7.98                                                                                                         | 0.425                     | 18.64                                       | 3.097                                              | 16.6                                                                     | 17.704                                    | 14.83                                                      |                                                         | 0.427                         |                                          |                                                                                       |                                                                                        |
| US                   | 3414                                                   | 20.66                                                    | 8.25                                                                                                         | 0.420                     | 24.93                                       | 6.122                                              | 24.6                                                                     | 17.650                                    | 18.59                                                      |                                                         | 0.422                         |                                          |                                                                                       |                                                                                        |
|                      | 3481                                                   | 25.65                                                    | 8.54                                                                                                         | 0.416                     | 31.42                                       | 8.239                                              | 26.2                                                                     | 17.595                                    | 23.16                                                      |                                                         | 0.418                         |                                          | 0.79                                                                                  |                                                                                        |
|                      | 3549                                                   | 31.45                                                    | 8.84                                                                                                         | 0.411                     | 38.15                                       | 9.591                                              | 25.1                                                                     | 17.538                                    | 28.55                                                      | 0.79                                                    | 0.414                         | 8.50E-05                                 | 1.31                                                                                  |                                                                                        |
|                      | 3616                                                   | 37.98                                                    | 9.12                                                                                                         | 0.407                     | 45.20                                       | 10.392                                             | 23.0                                                                     | 17.483                                    | 34.71                                                      | 0.74                                                    | 0.409                         | 7.34E-05                                 | 1.86                                                                                  |                                                                                        |
|                      | 3684                                                   | 45.09                                                    | 9.40                                                                                                         | 0.403                     | 52.63                                       | 10.895                                             | 20.7                                                                     | 17.429                                    | 41.53                                                      | 0.74                                                    | 0.405                         | 6.67E-05                                 | 2.48                                                                                  |                                                                                        |
|                      | 3751                                                   | 52.60                                                    | 9.67                                                                                                         | 0.398                     | 60.35                                       | 11.248                                             | 18.6                                                                     | 17.378                                    | 48.85                                                      | 0.74                                                    | 0.400                         | 6.05E-05                                 | 3.14                                                                                  |                                                                                        |
|                      | 3819                                                   | 60.39                                                    | 9.95                                                                                                         | 0.394                     | 68.50                                       | 11.790                                             | 17.2                                                                     | 17.324                                    | 56.50                                                      | 0.75                                                    | 0.396                         | 5.95E-05                                 | 3.86                                                                                  |                                                                                        |

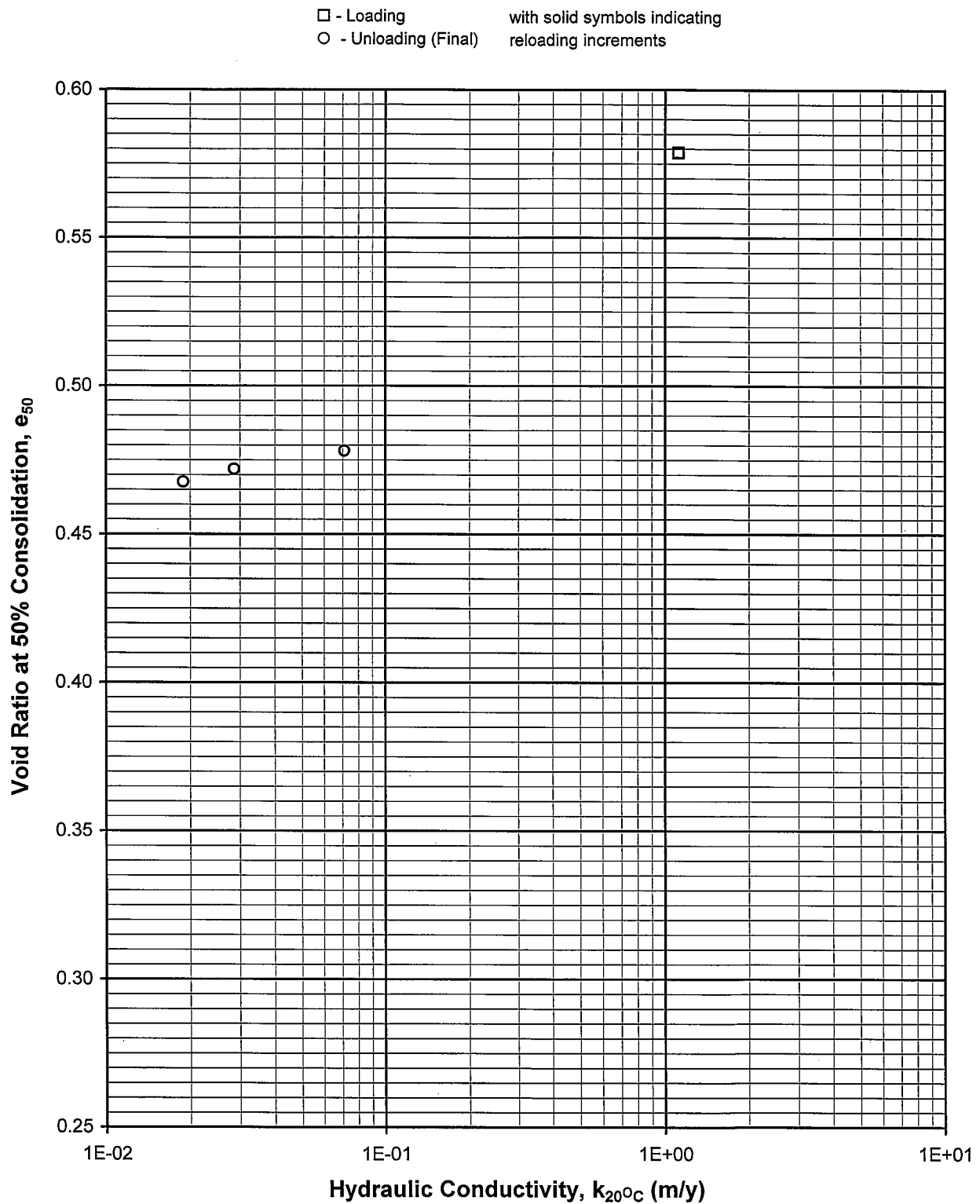
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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-12A - Depth 80.0 - 81.7 ft  
 Boring B-2359UD



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-12A - Depth 80.0 - 81.7 ft  
Boring B-2359UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2359\_UD12a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.660 ☒ Meas. ; ☐ Assumed Ring No.: 3  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.723  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                          |                                           |                                |                                   |                                  |                                                          |                         |
|------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | <input type="checkbox"/> Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                     | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lbf) =                                      | No. Layers =            |
| Sample No.: UD-12                        | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lbf) =                                     | Drop (in.) =            |
| Depth (ft): 80.0 - 81.7                  | Specimen No.: A                           |                                |                                   | Kneading                         | <input type="checkbox"/> Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| Spec. Selection by X-ray;                | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                                            | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                 |                                                          | Initial - Trimming Location |                                   |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|------------------------------------|----------------------------------------------------------|-----------------------------|-----------------------------------|------------|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                    |                                                          | Top (W1)                    | Bottom (W2)                       | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 333.41  | 333.19 |
| Container No.                      |                                                          | S9                          | 623                               | 2013       | 802                                   | Mass Ring (g)                                              | 211.71  |        |
| Mass Moist Soil + Container (g)    |                                                          | 125.62                      | 105.43                            | 101.00     | 71.63                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 121.70  | 121.48 |
| Mass Dry Soil + Container (g)      |                                                          | 110.61                      | 94.53                             | 90.02      | 64.98                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                 |                                                          | 30.24                       | 31.51                             | 30.61      | 32.03                                 | Container No.                                              |         | 2009   |
| WATER CONTENT (%)                  |                                                          | 18.68                       | 17.30                             | 18.48      | 20.18                                 | Mass Dry Soil + Container (g)                              |         | 30.54  |
| Avg. Initial Water Content, W4 (%) |                                                          | 18.15                       | Final W <sub>at</sub> : X Slice ; |            | Whole Spec.                           | Mass Container (g)                                         |         | 30.51  |
|                                    | See attached data sheet(s) for additional water contents |                             |                                   |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 0.03   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                                                       |                                                                       |                                                                       | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                                                       | Final                                                                 |                                                                       | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 19.050 |
| with Spec.                                                                                                                                                                   | without Spec.                                                         | with Spec.                                                            | without Spec.                                                         | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 18.950                                                                                                                                                                       | 0.000                                                                 | 12.240                                                                | 13.140                                                                | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 18.904  | 12.208 |
| 18.900                                                                                                                                                                       | 0.000                                                                 | 12.090                                                                | 13.100                                                                | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 13.094 |
| 18.880                                                                                                                                                                       | 0.000                                                                 | 12.160                                                                | 13.080                                                                | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 18.904  | 18.164 |
| 18.890                                                                                                                                                                       | 0.000                                                                 | 12.310                                                                | 13.070                                                                | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 18.900                                                                                                                                                                       | 0.000                                                                 | 12.240                                                                | 13.080                                                                | Initial Height, $H_0$                                   |                                                                     | 18.904  |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$ | 1.024   |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_0 - \Delta H_{c,f}$           | 17.880  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                                                       |                                                                       |                                                                       |                                                         | Final Soil Height Measurement, $H_{f,m}$                            | 18.164  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                                                       |                                                                       |                                                                       |                                                         | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_0$               | -1.50   |        |

| Estimated Initial Unit Weight                                                                         |                                    | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) = 126.69                                                                  | Dry, $\gamma_{d,o}$ (pcf) = 107.23 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |                                    | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |                                    | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |                                    | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Pale Brown Clayey SAND (SC)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 4/1/2008 Date: 4/1/2008 Final Calc. By: LF Date: 4/4/2008  
 Reviewed By: HP **HP**

Note: NA - Not Applicable

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2359\_UD12a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.660 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |       |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|-------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial  |
| 1                | Initial, Top, W1      | 18.68                    | 102.55                   | 89.9                         | 99.8                  | 104.8 |
| 2                | " Bottom, W2          | 17.30                    | 103.75                   | 86.0                         | 95.7                  | 100.6 |
| 3                | " Sides, W3           | 18.48                    | 102.72                   | 89.3                         | 99.3                  | 104.2 |
| 4                | " Average, W4         | 18.15                    | 103.00                   | 88.4                         | 98.3                  | 103.2 |
| 5                | " Back Calculated (1) | 20.36                    | 101.11 (3)               | 94.2                         | 104.4                 | 109.5 |
| 6                | Final                 | 20.18                    | 101.11 (2)               | 94.2                         | 104.4                 | 109.5 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. <u>5</u>                                                                              | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = <u>2.722</u>                                                                              |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = <u>2.691</u>                                              |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_e$                                                                | 0.11872 |
| Final Selected, $K_f$                                                           | 0.11872 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = <u>102.49</u>                                                                |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = <u>101.80</u>                                         |  |                              |

| Summary of Specimen Physical Properties  |                        |                                              |                                                               |                                                  |                             |  |                                     |  |                                                                      |
|------------------------------------------|------------------------|----------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|-----------------------------|--|-------------------------------------|--|----------------------------------------------------------------------|
| Specific Gravity<br>$G_s$ = <u>2.660</u> |                        | <input checked="" type="checkbox"/> Assumed  | To make $S_f$ = 100% at end of test.                          |                                                  |                             |  |                                     |  |                                                                      |
|                                          |                        | <input checked="" type="checkbox"/> Measured | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_f$ = 100% |                                                  |                             |  |                                     |  |                                                                      |
| Mass Dry Soil, (g)                       | Initial: <u>101.11</u> | <input checked="" type="checkbox"/>          | From Cal. Routine No. <u>5</u>                                | Note: Routine #5 is based on final measurements. |                             |  |                                     |  |                                                                      |
|                                          | Final (4): <u>NA</u>   |                                              | Make $S_f$ = 100%, or;                                        | Avg. of measured & make $S_f$ = 100%             |                             |  |                                     |  |                                                                      |
| Initial Height (mm) = <u>18.90</u>       |                        | <input checked="" type="checkbox"/>          | Measured ;                                                    | Back Calculated Back-cal. Sat. (%) = <u>NA</u>   |                             |  |                                     |  |                                                                      |
| Final Height (mm) = <u>18.16</u>         |                        | <input checked="" type="checkbox"/>          | Measured ;                                                    | Initial $H_o$ & dial change during loading       |                             |  |                                     |  |                                                                      |
|                                          | Water Content, w (%)   |                                              | Void Ratio, e                                                 |                                                  | Degree of Saturation, S (%) |  | Total Unit Weight, $\gamma_t$ (pcf) |  | Dry Unit Weight, $\gamma_d$ (pcf)                                    |
|                                          |                        |                                              |                                                               |                                                  |                             |  | Height of Solids, $H_s$ (2,4) (mm)  |  | Extruded soil loss proportioned in increasing loading increments (5) |
| Initial                                  | 20.4                   |                                              | 0.575                                                         |                                                  | 94.2                        |  | 126.7                               |  | 105.3                                                                |
| Final                                    | 20.1                   |                                              | 0.513                                                         |                                                  | 104.4                       |  | 131.6                               |  | 109.5                                                                |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 26 | Minus 200 (%) |
| Casagrande Method      | 27.00             | NA                                | 0.084 | 0.010 | 3.3 | Plastic Limit (PL)    | 14 | 38.8          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       | NA    |     | Plasticity Index (PI) | 12 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP  
 Date: 4/7/2008

# ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2359\_UD12a  
 Task No.: NA Date; Start: 4/1/2008 Initial Height,  $H_o$  (mm): 18.90  
 Project Name: Exelon (Victoria) Completed: 4/4/2008 Ring Area,  $A_r$  (cm<sup>2</sup>): 31.7233  
 Test: Initial / Pressure Gauge Back Pressure,  $U_G$  (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.  
 Reference Values: Back Pressure,  $U_{b,BE}$  (psi): 70.63289,  $V$ : 0.02312353 Piston Uplift,  $P_{up}$  (lbf): 34.70  
 Back Pressure,  $U_{b,CS}$  (psi): 70.63292,  $V$ : 0.02312354 Setup  $DT_{ref}$  (V): 0.04736603  
 Displacement Transducer No.: DT-103 Calib. Factor (mm/V): -213.848 Ch. No.: 7  
 Pore Press. Transducer No.: PT-108 Calib. Factor (psi/V): 3029.501 Ref. Zero (V): -0.000191 Ch. No.: 8  
 Force Cell No.: FT-103 Calib. Factor (lbf/V): 161103.256 Ref. Zero (V): 0.000105 Ch. No.: 9

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain  
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress ( $\sigma_v$ ) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: LF Reviewed By: HP *HP*

Remarks: \_\_\_\_\_

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>$n$ & $n-1$ ,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| S                            | 92                    | 17 : 15 : 00         |                                                                    | 0.12                                                        |                                                            | 0.000                                                         |                                                                       |                                                                         |                                                                                   |
| BS                           | 92                    | 17 : 27 : 00         |                                                                    | 0.40                                                        |                                                            | 0.040                                                         | 0.000                                                                 | 0.040                                                                   |                                                                                   |
| BE                           | 93                    | 09 : 02 : 00         |                                                                    | 0.17                                                        | 0.000                                                      | 0.034                                                         | 0.000                                                                 | 0.034                                                                   |                                                                                   |
| CS                           | 93                    | 09 : 03 : 00         | 0                                                                  | 0.18                                                        | 0.000                                                      | 0.034                                                         | 0.004                                                                 | 0.030                                                                   |                                                                                   |
|                              | 93                    | 09 : 17 : 00         | 14                                                                 | 0.69                                                        | 0.001                                                      | 0.081                                                         | 0.012                                                                 | 0.069                                                                   | 0.882                                                                             |
|                              | 93                    | 09 : 31 : 00         | 28                                                                 | 1.11                                                        | -0.001                                                     | 0.139                                                         | 0.025                                                                 | 0.114                                                                   | 1.036                                                                             |
|                              | 93                    | 09 : 45 : 00         | 42                                                                 | 1.60                                                        | 0.001                                                      | 0.198                                                         | 0.038                                                                 | 0.160                                                                   | 1.031                                                                             |
|                              | 93                    | 10 : 10 : 00         | 67                                                                 | 2.80                                                        | 0.001                                                      | 0.300                                                         | 0.062                                                                 | 0.238                                                                   | 0.998                                                                             |
| US                           | 93                    | 10 : 38 : 00         | 95                                                                 | 4.71                                                        | 0.004                                                      | 0.417                                                         | 0.086                                                                 | 0.331                                                                   | 1.045                                                                             |
|                              | 93                    | 11 : 06 : 00         | 123                                                                | 7.03                                                        | 0.002                                                      | 0.519                                                         | 0.107                                                                 | 0.412                                                                   | 0.923                                                                             |
|                              | 93                    | 11 : 34 : 00         | 151                                                                | 10.40                                                       | -0.003                                                     | 0.620                                                         | 0.130                                                                 | 0.490                                                                   | 0.886                                                                             |
|                              | 93                    | 12 : 02 : 00         | 179                                                                | 14.50                                                       | -0.002                                                     | 0.721                                                         | 0.152                                                                 | 0.569                                                                   | 0.888                                                                             |
|                              | 93                    | 12 : 30 : 00         | 207                                                                | 19.28                                                       | -0.002                                                     | 0.818                                                         | 0.174                                                                 | 0.644                                                                   | 0.850                                                                             |
|                              | 93                    | 12 : 58 : 00         | 235                                                                | 24.66                                                       | -0.003                                                     | 0.913                                                         | 0.195                                                                 | 0.718                                                                   | 0.844                                                                             |
|                              | 93                    | 13 : 26 : 00         | 263                                                                | 30.26                                                       | -0.004                                                     | 1.009                                                         | 0.216                                                                 | 0.794                                                                   | 0.860                                                                             |
|                              | 93                    | 13 : 54 : 00         | 291                                                                | 35.99                                                       | -0.003                                                     | 1.105                                                         | 0.234                                                                 | 0.870                                                                   | 0.864                                                                             |
|                              | 93                    | 14 : 22 : 00         | 319                                                                | 42.29                                                       | -0.002                                                     | 1.199                                                         | 0.254                                                                 | 0.945                                                                   | 0.848                                                                             |
|                              | 93                    | 14 : 50 : 00         | 347                                                                | 48.83                                                       | -0.002                                                     | 1.293                                                         | 0.273                                                                 | 1.020                                                                   | 0.854                                                                             |
|                              | 93                    | 15 : 18 : 00         | 375                                                                | 55.90                                                       | -0.001                                                     | 1.388                                                         | 0.292                                                                 | 1.096                                                                   | 0.863                                                                             |
|                              | 93                    | 15 : 46 : 00         | 403                                                                | 63.40                                                       | -0.001                                                     | 1.480                                                         | 0.311                                                                 | 1.169                                                                   | 0.829                                                                             |
|                              | 93                    | 16 : 14 : 00         | 431                                                                | 71.57                                                       | -0.002                                                     | 1.573                                                         | 0.331                                                                 | 1.242                                                                   | 0.817                                                                             |
|                              | 93                    | 16 : 42 : 00         | 459                                                                | 80.17                                                       | -0.003                                                     | 1.661                                                         | 0.351                                                                 | 1.311                                                                   | 0.781                                                                             |
| UE                           | 93                    | 17 : 10 : 00         | 487                                                                | 89.24                                                       | -0.002                                                     | 1.750                                                         | 0.371                                                                 | 1.378                                                                   | 0.770                                                                             |
|                              | 93                    | 17 : 38 : 00         | 515                                                                | 98.71                                                       | -0.004                                                     | 1.836                                                         | 0.391                                                                 | 1.445                                                                   | 0.756                                                                             |

**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                              | 93                    | 17 : 42 : 00         | 519                                                                | 100.13                                                      | -0.005                                                     | 1.849                                                         | 0.394                                                                 | 1.455                                                                   | 0.746                                                                        |
|                              | 93                    | 17 : 44 : 00         | 521                                                                | 99.53                                                       | -0.006                                                     | 1.850                                                         | 0.393                                                                 | 1.457                                                                   | 0.457                                                                        |
|                              | 93                    | 18 : 20 : 00         | 557                                                                | 96.01                                                       | -0.009                                                     | 1.861                                                         | 0.387                                                                 | 1.475                                                                   | 0.151                                                                        |
|                              | 93                    | 18 : 56 : 00         | 593                                                                | 90.14                                                       | -0.011                                                     | 1.851                                                         | 0.376                                                                 | 1.475                                                                   | 0.008                                                                        |
|                              | 93                    | 19 : 32 : 00         | 629                                                                | 77.15                                                       | -0.011                                                     | 1.818                                                         | 0.350                                                                 | 1.468                                                                   | -0.065                                                                       |
|                              | 93                    | 20 : 08 : 00         | 665                                                                | 64.00                                                       | -0.013                                                     | 1.781                                                         | 0.323                                                                 | 1.458                                                                   | -0.085                                                                       |
|                              | 93                    | 20 : 44 : 00         | 701                                                                | 51.77                                                       | -0.013                                                     | 1.743                                                         | 0.296                                                                 | 1.447                                                                   | -0.103                                                                       |
| US                           | 93                    | 21 : 20 : 00         | 737                                                                | 40.63                                                       | -0.013                                                     | 1.701                                                         | 0.269                                                                 | 1.432                                                                   | -0.133                                                                       |
|                              | 93                    | 21 : 56 : 00         | 773                                                                | 30.71                                                       | -0.014                                                     | 1.657                                                         | 0.243                                                                 | 1.414                                                                   | -0.159                                                                       |
|                              | 93                    | 22 : 32 : 00         | 809                                                                | 22.21                                                       | -0.016                                                     | 1.611                                                         | 0.218                                                                 | 1.392                                                                   | -0.191                                                                       |
|                              | 93                    | 23 : 08 : 00         | 845                                                                | 15.42                                                       | -0.016                                                     | 1.562                                                         | 0.195                                                                 | 1.367                                                                   | -0.220                                                                       |
| UE                           | 93                    | 23 : 44 : 00         | 881                                                                | 10.11                                                       | -0.018                                                     | 1.510                                                         | 0.173                                                                 | 1.336                                                                   | -0.273                                                                       |
|                              | 93                    | 23 : 46 : 00         | 883                                                                | 9.86                                                        | -0.017                                                     | 1.507                                                         | 0.172                                                                 | 1.334                                                                   | -0.286                                                                       |
|                              | 93                    | 23 : 48 : 00         | 885                                                                | 9.88                                                        | -0.017                                                     | 1.505                                                         | 0.172                                                                 | 1.333                                                                   | -0.190                                                                       |
|                              | 94                    | 00 : 02 : 00         | 899                                                                | 10.71                                                       | -0.015                                                     | 1.512                                                         | 0.176                                                                 | 1.336                                                                   | 0.058                                                                        |
|                              | 94                    | 00 : 16 : 00         | 913                                                                | 16.01                                                       | -0.015                                                     | 1.537                                                         | 0.198                                                                 | 1.340                                                                   | 0.089                                                                        |
|                              | 94                    | 00 : 30 : 00         | 927                                                                | 21.61                                                       | -0.016                                                     | 1.569                                                         | 0.217                                                                 | 1.352                                                                   | 0.291                                                                        |
|                              | 94                    | 00 : 44 : 00         | 941                                                                | 27.58                                                       | -0.017                                                     | 1.601                                                         | 0.235                                                                 | 1.366                                                                   | 0.309                                                                        |
|                              | 94                    | 00 : 58 : 00         | 955                                                                | 34.13                                                       | -0.016                                                     | 1.633                                                         | 0.253                                                                 | 1.380                                                                   | 0.323                                                                        |
| US                           | 94                    | 01 : 12 : 00         | 969                                                                | 41.07                                                       | -0.017                                                     | 1.665                                                         | 0.270                                                                 | 1.395                                                                   | 0.325                                                                        |
|                              | 94                    | 01 : 26 : 00         | 983                                                                | 48.21                                                       | -0.017                                                     | 1.696                                                         | 0.288                                                                 | 1.408                                                                   | 0.315                                                                        |
|                              | 94                    | 01 : 40 : 00         | 997                                                                | 55.52                                                       | -0.017                                                     | 1.727                                                         | 0.304                                                                 | 1.423                                                                   | 0.325                                                                        |
|                              | 94                    | 01 : 54 : 00         | 1011                                                               | 62.97                                                       | -0.017                                                     | 1.758                                                         | 0.321                                                                 | 1.437                                                                   | 0.333                                                                        |
|                              | 94                    | 02 : 08 : 00         | 1025                                                               | 70.36                                                       | -0.018                                                     | 1.790                                                         | 0.336                                                                 | 1.454                                                                   | 0.370                                                                        |
|                              | 94                    | 02 : 22 : 00         | 1039                                                               | 77.80                                                       | -0.017                                                     | 1.824                                                         | 0.352                                                                 | 1.473                                                                   | 0.434                                                                        |
|                              | 94                    | 02 : 36 : 00         | 1053                                                               | 85.24                                                       | -0.014                                                     | 1.857                                                         | 0.366                                                                 | 1.490                                                                   | 0.396                                                                        |
|                              | 94                    | 02 : 50 : 00         | 1067                                                               | 92.32                                                       | -0.014                                                     | 1.890                                                         | 0.380                                                                 | 1.510                                                                   | 0.443                                                                        |
|                              | 94                    | 03 : 04 : 00         | 1081                                                               | 99.21                                                       | -0.013                                                     | 1.924                                                         | 0.392                                                                 | 1.532                                                                   | 0.493                                                                        |
|                              | 94                    | 03 : 18 : 00         | 1095                                                               | 105.95                                                      | -0.014                                                     | 1.961                                                         | 0.406                                                                 | 1.555                                                                   | 0.522                                                                        |
|                              | 94                    | 03 : 32 : 00         | 1109                                                               | 112.38                                                      | -0.013                                                     | 1.998                                                         | 0.419                                                                 | 1.579                                                                   | 0.556                                                                        |
|                              | 94                    | 03 : 46 : 00         | 1123                                                               | 118.61                                                      | -0.013                                                     | 2.037                                                         | 0.431                                                                 | 1.606                                                                   | 0.602                                                                        |
|                              | 94                    | 04 : 00 : 00         | 1137                                                               | 124.71                                                      | -0.014                                                     | 2.075                                                         | 0.443                                                                 | 1.633                                                                   | 0.608                                                                        |
|                              | 94                    | 04 : 14 : 00         | 1151                                                               | 130.82                                                      | -0.013                                                     | 2.114                                                         | 0.454                                                                 | 1.660                                                                   | 0.630                                                                        |
|                              | 94                    | 04 : 28 : 00         | 1165                                                               | 136.72                                                      | -0.013                                                     | 2.155                                                         | 0.465                                                                 | 1.690                                                                   | 0.667                                                                        |
|                              | 94                    | 04 : 42 : 00         | 1179                                                               | 142.19                                                      | -0.015                                                     | 2.193                                                         | 0.475                                                                 | 1.718                                                                   | 0.644                                                                        |
| UE                           | 94                    | 04 : 54 : 00         | 1191                                                               | 146.88                                                      | -0.014                                                     | 2.222                                                         | 0.483                                                                 | 1.739                                                                   | 0.548                                                                        |
|                              | 94                    | 04 : 56 : 00         | 1193                                                               | 146.31                                                      | -0.016                                                     | 2.224                                                         | 0.482                                                                 | 1.742                                                                   | 0.426                                                                        |
|                              | 94                    | 06 : 16 : 00         | 1273                                                               | 137.28                                                      | -0.018                                                     | 2.232                                                         | 0.467                                                                 | 1.765                                                                   | 0.092                                                                        |
|                              | 94                    | 07 : 36 : 00         | 1353                                                               | 105.67                                                      | -0.022                                                     | 2.171                                                         | 0.413                                                                 | 1.758                                                                   | -0.029                                                                       |
|                              | 94                    | 08 : 56 : 00         | 1433                                                               | 75.14                                                       | -0.024                                                     | 2.085                                                         | 0.355                                                                 | 1.730                                                                   | -0.110                                                                       |
| US                           | 94                    | 10 : 16 : 00         | 1513                                                               | 48.47                                                       | -0.022                                                     | 1.995                                                         | 0.298                                                                 | 1.697                                                                   | -0.131                                                                       |
|                              | 94                    | 11 : 36 : 00         | 1593                                                               | 26.69                                                       | -0.025                                                     | 1.896                                                         | 0.241                                                                 | 1.655                                                                   | -0.167                                                                       |

### ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-3  
 Task No.: NA Date; Start: 4/1/2008  
 Project Name: Exelon (Victoria) Completed: 4/4/2008

☒ Undisturbed or ; ☐ Reconstituted - Specimen.

File Name: B-2359\_UD1;

Back Pressure,  $U_{b,CS}$  (psi): 70.6 Piston Uplift,  $P_{up}$  (lbf): 34.70

Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 =$  0.5

☐ Data corrected for salt \_\_\_\_\_; in ☐ g/kg

D 4186-06-Summary of Methods: NA

Final Description of Specimen: Pale Brown Clayey SAND (SC)

|                                |              |                                 |               |                         |               |                           |              |                                             |                                  |
|--------------------------------|--------------|---------------------------------|---------------|-------------------------|---------------|---------------------------|--------------|---------------------------------------------|----------------------------------|
| Ring No.:                      | <u>3</u>     | Area, $A_r$ (cm <sup>2</sup> ): | <u>31.723</u> | Solids Ht., $H_s$ (mm): | <u>12.004</u> | Specific Gravity, $G_s =$ | <u>2.660</u> | <input checked="" type="checkbox"/> Meas. ; | <input type="checkbox"/> Assumed |
| <b>Initial:</b> Height $H_o$ : | <u>18.90</u> | Water                           | <u>20.4</u>   | Void                    | <u>0.575</u>  | Deg. of                   | <u>94.2</u>  | Total Unit                                  | <u>126.7</u>                     |
| <b>Final:</b> (mm): $H_f$ :    | <u>18.16</u> | Content, $w$ (%):               | <u>20.1</u>   | Ratio, $e$ :            | <u>0.513</u>  | Sat., $S$ (%):            | <u>104.4</u> | Weight, $\gamma_t$ (pcf):                   | <u>131.6</u>                     |
|                                |              |                                 |               |                         |               |                           |              | Weight, $\gamma_d$ (pcf):                   | <u>109.5</u>                     |

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$c_v \cdot t_n \cdot UCF$<br>$T_v \cdot (H_{c,avg})^2$ | Rate of<br>Secondary<br>Comp. (3),<br>$c_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                       |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                  |                                                                                                       |
| S                            |                                                                          |                                                                         |                                                                                                                       |                                    | 0.12                                                    |                                                                |                                                                                         |                                                       | Data on given line represents average conditions                          |                                                                     |                                        |                                                   |                                                                                                  |                                                                                                       |
| BS                           |                                                                          |                                                                         | 0.21                                                                                                                  | 0.571                              | 0.40                                                    |                                                                |                                                                                         | 18.864                                                | between that line and the previous line of data.                          |                                                                     |                                        |                                                   |                                                                                                  |                                                                                                       |
| BE                           |                                                                          | 0.17                                                                    | 0.18                                                                                                                  | 0.572                              | 0.17                                                    | 0.000                                                          | 0.0                                                                                     | 18.870                                                |                                                                           |                                                                     | 0.572                                  |                                                   |                                                                                                  |                                                                                                       |
| CS                           | 0                                                                        | 0.18                                                                    | 0.16                                                                                                                  | 0.572                              | 0.18                                                    | 0.000                                                          | 0.0                                                                                     | 18.874                                                |                                                                           |                                                                     | 0.572                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 14                                                                       | 0.69                                                                    | 0.36                                                                                                                  | 0.569                              | 0.69                                                    | 0.001                                                          | 0.1                                                                                     | 18.835                                                | 0.43                                                                      |                                                                     | 0.571                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 28                                                                       | 1.11                                                                    | 0.60                                                                                                                  | 0.565                              | 1.11                                                    | -0.001                                                         | -0.1                                                                                    | 18.790                                                | 0.90                                                                      |                                                                     | 0.567                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 42                                                                       | 1.60                                                                    | 0.85                                                                                                                  | 0.562                              | 1.60                                                    | 0.001                                                          | 0.1                                                                                     | 18.744                                                | 1.36                                                                      |                                                                     | 0.563                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 67                                                                       | 2.80                                                                    | 1.26                                                                                                                  | 0.555                              | 2.80                                                    | 0.001                                                          | 0.0                                                                                     | 18.666                                                | 2.20                                                                      |                                                                     | 0.558                                  |                                                   |                                                                                                  |                                                                                                       |
| US                           | 95                                                                       | 4.71                                                                    | 1.75                                                                                                                  | 0.547                              | 4.71                                                    | 0.004                                                          | 0.1                                                                                     | 18.573                                                | 3.76                                                                      |                                                                     | 0.551                                  |                                                   |                                                                                                  |                                                                                                       |
|                              | 123                                                                      | 7.03                                                                    | 2.18                                                                                                                  | 0.541                              | 7.03                                                    | 0.002                                                          | 0.0                                                                                     | 18.492                                                | 5.87                                                                      | 2980.58                                                             | 0.544                                  | 1.12E+00                                          | 924.61                                                                                           |                                                                                                       |
|                              | 151                                                                      | 10.41                                                                   | 2.59                                                                                                                  | 0.534                              | 10.40                                                   | -0.003                                                         | 0.0                                                                                     | 18.414                                                | 8.72                                                                      |                                                                     | 0.537                                  |                                                   | -9543.52                                                                                         |                                                                                                       |
|                              | 179                                                                      | 14.50                                                                   | 3.01                                                                                                                  | 0.527                              | 14.50                                                   | -0.002                                                         | 0.0                                                                                     | 18.335                                                | 12.45                                                                     |                                                                     | 0.531                                  |                                                   | -4682.64                                                                                         |                                                                                                       |
|                              | 207                                                                      | 19.28                                                                   | 3.40                                                                                                                  | 0.521                              | 19.28                                                   | -0.002                                                         | 0.0                                                                                     | 18.260                                                | 16.89                                                                     |                                                                     | 0.524                                  |                                                   | -9060.23                                                                                         |                                                                                                       |
|                              | 235                                                                      | 24.66                                                                   | 3.80                                                                                                                  | 0.515                              | 24.66                                                   | -0.003                                                         | 0.0                                                                                     | 18.186                                                | 21.97                                                                     |                                                                     | 0.518                                  |                                                   | -11492.68                                                                                        |                                                                                                       |
|                              | 263                                                                      | 30.26                                                                   | 4.20                                                                                                                  | 0.509                              | 30.26                                                   | -0.004                                                         | 0.0                                                                                     | 18.110                                                | 27.46                                                                     |                                                                     | 0.512                                  |                                                   | -9674.17                                                                                         |                                                                                                       |
|                              | 291                                                                      | 35.99                                                                   | 4.60                                                                                                                  | 0.502                              | 35.99                                                   | -0.003                                                         | 0.0                                                                                     | 18.034                                                | 33.13                                                                     |                                                                     | 0.506                                  |                                                   | -11251.80                                                                                        |                                                                                                       |
|                              | 319                                                                      | 42.29                                                                   | 5.00                                                                                                                  | 0.496                              | 42.29                                                   | -0.002                                                         | 0.0                                                                                     | 17.959                                                | 39.14                                                                     |                                                                     | 0.499                                  |                                                   | -21210.45                                                                                        |                                                                                                       |

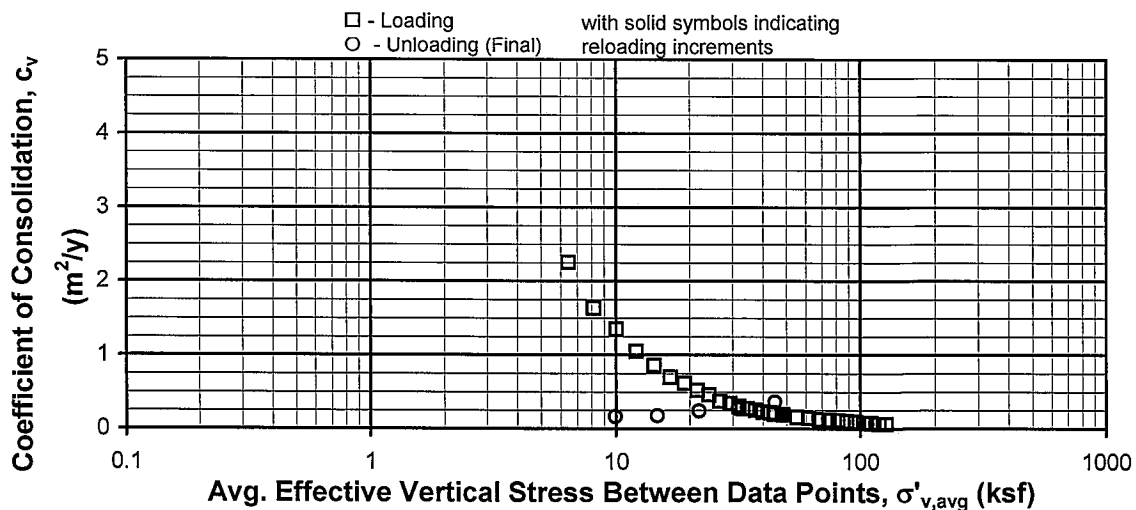
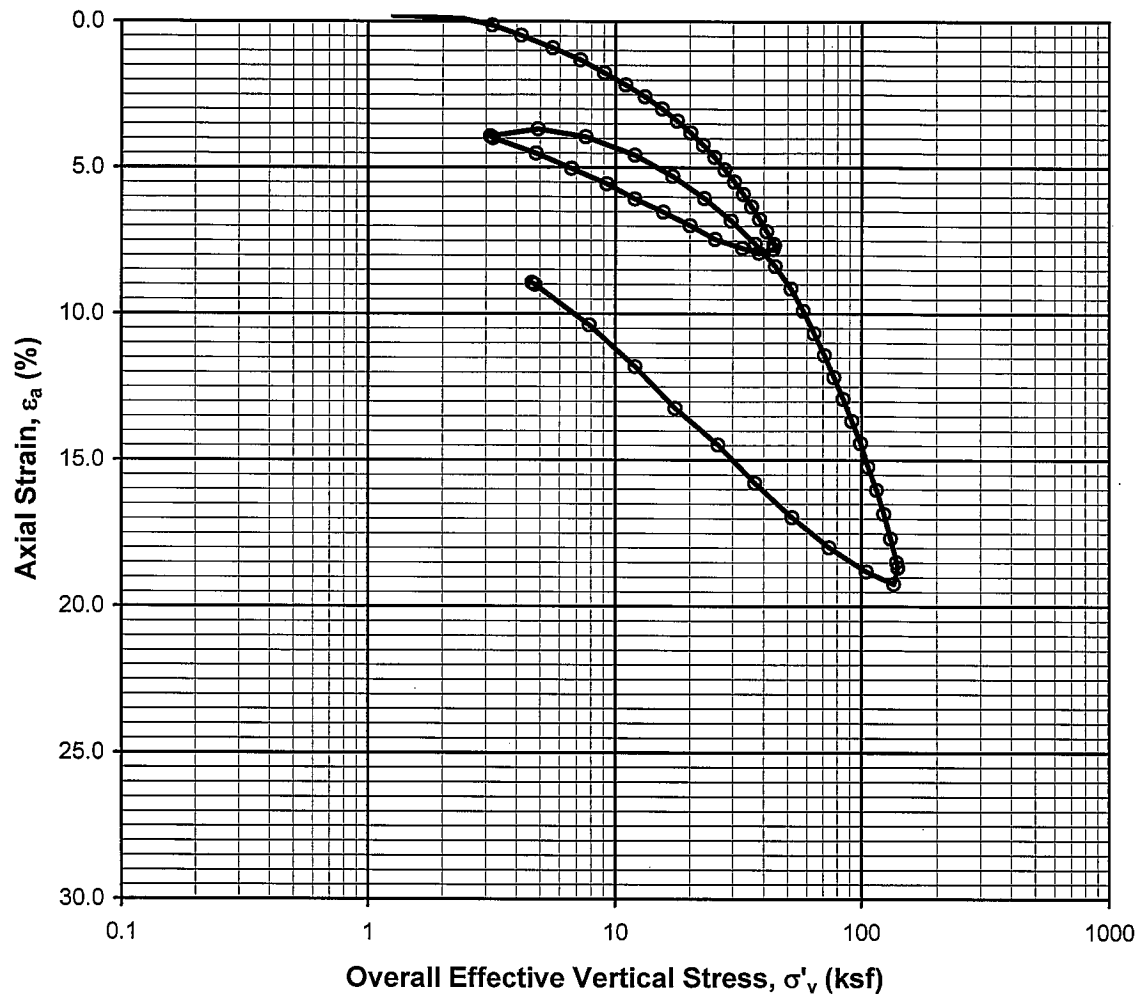


# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Load-<br>ing<br>Info.<br>(1) | Elapsed<br>Time<br>from<br>Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Overall<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,n}$<br>(ksf) | Corrected<br>Volumetric<br>(Axial) Strain,<br>$\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ )<br>$\Delta H_{c,n} / H_o$<br>(%) | Overall<br>Void<br>Ratio,<br>$e_n$ | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$ (2)<br>(ksf) | Loading<br>Pore-Water<br>Pressure<br>Ratio, $R_u$<br>$\Delta U_n / \sigma_{v,n}$<br>(%) | Corrected<br>Specimen<br>Height,<br>$H_{c,n}$<br>(mm) | Calculations Between n and n-1                                            |                                                                     |                                        |                                                   | Steady<br>State<br>Ratio,<br>$SSR_n =$<br>$\frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of<br>Secondary<br>Comp. (3),<br>$C_\alpha =$<br>$\Delta d_{a,sc} / H_o$<br>( $\times 10^{-4}$ ) |
|------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|                              |                                                                          |                                                                         |                                                                                                                             |                                    |                                                         |                                                                |                                                                                         |                                                       | Average<br>Effective<br>Vertical<br>Stress,<br>$\sigma'_{v,avg}$<br>(ksf) | Coefficient<br>of<br>Consolidation,<br>$c_v$<br>(m <sup>2</sup> /y) | Average<br>Void<br>Ratio,<br>$e_{avg}$ | Hydraulic<br>Conductivity,<br>$k$ @ 20°C<br>(m/y) |                                                                                                     |                                                                                                       |
|                              | 347                                                                      | 48.83                                                                   | 5.40                                                                                                                        | 0.490                              | 48.83                                                   | -0.002                                                         | 0.0                                                                                     | 17.884                                                | 45.56                                                                     |                                                                     | 0.493                                  |                                                   | -28686.95                                                                                           |                                                                                                       |
|                              | 375                                                                      | 55.90                                                                   | 5.80                                                                                                                        | 0.484                              | 55.90                                                   | -0.001                                                         | 0.0                                                                                     | 17.808                                                | 52.37                                                                     |                                                                     | 0.487                                  |                                                   | -39714.99                                                                                           |                                                                                                       |
|                              | 403                                                                      | 63.40                                                                   | 6.19                                                                                                                        | 0.477                              | 63.40                                                   | -0.001                                                         | 0.0                                                                                     | 17.735                                                | 59.65                                                                     |                                                                     | 0.480                                  |                                                   | -67392.62                                                                                           |                                                                                                       |
|                              | 431                                                                      | 71.57                                                                   | 6.57                                                                                                                        | 0.471                              | 71.57                                                   | -0.002                                                         | 0.0                                                                                     | 17.662                                                | 67.48                                                                     |                                                                     | 0.474                                  |                                                   | -66763.22                                                                                           |                                                                                                       |
|                              | 459                                                                      | 80.17                                                                   | 6.93                                                                                                                        | 0.466                              | 80.17                                                   | -0.003                                                         | 0.0                                                                                     | 17.593                                                | 75.87                                                                     |                                                                     | 0.469                                  |                                                   | -52376.13                                                                                           |                                                                                                       |
| UE                           | 487                                                                      | 89.24                                                                   | 7.29                                                                                                                        | 0.460                              | 89.24                                                   | -0.002                                                         | 0.0                                                                                     | 17.526                                                | 84.71                                                                     |                                                                     | 0.463                                  |                                                   | -50160.57                                                                                           |                                                                                                       |
|                              | 515                                                                      | 98.71                                                                   | 7.64                                                                                                                        | 0.454                              | 98.71                                                   | -0.004                                                         | 0.0                                                                                     | 17.459                                                | 93.98                                                                     |                                                                     | 0.457                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 519                                                                      | 100.13                                                                  | 7.69                                                                                                                        | 0.454                              | 100.13                                                  | -0.005                                                         | 0.0                                                                                     | 17.449                                                | 99.42                                                                     |                                                                     | 0.454                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 521                                                                      | 99.54                                                                   | 7.71                                                                                                                        | 0.453                              | 99.53                                                   | -0.006                                                         | 0.0                                                                                     | 17.447                                                | 99.84                                                                     |                                                                     | 0.454                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 557                                                                      | 96.01                                                                   | 7.80                                                                                                                        | 0.452                              | 96.01                                                   | -0.009                                                         | 0.0                                                                                     | 17.429                                                | 97.77                                                                     |                                                                     | 0.453                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 593                                                                      | 90.15                                                                   | 7.80                                                                                                                        | 0.452                              | 90.14                                                   | -0.011                                                         | 0.0                                                                                     | 17.429                                                | 93.08                                                                     |                                                                     | 0.452                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 629                                                                      | 77.15                                                                   | 7.77                                                                                                                        | 0.453                              | 77.15                                                   | -0.011                                                         | 0.0                                                                                     | 17.436                                                | 83.65                                                                     |                                                                     | 0.452                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 665                                                                      | 64.01                                                                   | 7.71                                                                                                                        | 0.453                              | 64.00                                                   | -0.013                                                         | 0.0                                                                                     | 17.446                                                | 70.58                                                                     |                                                                     | 0.453                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 701                                                                      | 51.78                                                                   | 7.65                                                                                                                        | 0.454                              | 51.77                                                   | -0.013                                                         | 0.0                                                                                     | 17.457                                                | 57.90                                                                     |                                                                     | 0.454                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 737                                                                      | 40.64                                                                   | 7.57                                                                                                                        | 0.456                              | 40.63                                                   | -0.013                                                         | 0.0                                                                                     | 17.472                                                | 46.21                                                                     |                                                                     | 0.455                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 773                                                                      | 30.72                                                                   | 7.48                                                                                                                        | 0.457                              | 30.71                                                   | -0.014                                                         | 0.0                                                                                     | 17.490                                                | 35.68                                                                     | 1646.53                                                             | 0.456                                  | 3.20E-02                                          | 738.08                                                                                              |                                                                                                       |
|                              | 809                                                                      | 22.22                                                                   | 7.36                                                                                                                        | 0.459                              | 22.21                                                   | -0.016                                                         | -0.1                                                                                    | 17.512                                                | 26.47                                                                     | 1285.84                                                             | 0.458                                  | 3.50E-02                                          | 1150.18                                                                                             |                                                                                                       |
|                              | 845                                                                      | 15.43                                                                   | 7.23                                                                                                                        | 0.461                              | 15.42                                                   | -0.016                                                         | -0.1                                                                                    | 17.537                                                | 18.83                                                                     | 960.17                                                              | 0.460                                  | 3.78E-02                                          | 1284.88                                                                                             |                                                                                                       |
| UE                           | 881                                                                      | 10.12                                                                   | 7.07                                                                                                                        | 0.464                              | 10.11                                                   | -0.018                                                         | -0.2                                                                                    | 17.568                                                | 12.78                                                                     | 712.96                                                              | 0.462                                  | 4.43E-02                                          | 1268.04                                                                                             |                                                                                                       |
|                              | 883                                                                      | 9.87                                                                    | 7.06                                                                                                                        | 0.464                              | 9.86                                                    | -0.017                                                         | -0.2                                                                                    | 17.570                                                | 10.00                                                                     |                                                                     | 0.464                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 885                                                                      | 9.89                                                                    | 7.05                                                                                                                        | 0.464                              | 9.88                                                    | -0.017                                                         | -0.2                                                                                    | 17.571                                                | 9.88                                                                      |                                                                     | 0.464                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 899                                                                      | 10.72                                                                   | 7.07                                                                                                                        | 0.464                              | 10.71                                                   | -0.015                                                         | -0.1                                                                                    | 17.568                                                | 10.31                                                                     |                                                                     | 0.464                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 913                                                                      | 16.02                                                                   | 7.09                                                                                                                        | 0.463                              | 16.01                                                   | -0.015                                                         | -0.1                                                                                    | 17.564                                                | 13.37                                                                     |                                                                     | 0.463                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 927                                                                      | 21.63                                                                   | 7.15                                                                                                                        | 0.462                              | 21.61                                                   | -0.016                                                         | -0.1                                                                                    | 17.552                                                | 18.82                                                                     |                                                                     | 0.463                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 941                                                                      | 27.59                                                                   | 7.23                                                                                                                        | 0.461                              | 27.58                                                   | -0.017                                                         | -0.1                                                                                    | 17.538                                                | 24.61                                                                     |                                                                     | 0.462                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 955                                                                      | 34.14                                                                   | 7.30                                                                                                                        | 0.460                              | 34.13                                                   | -0.016                                                         | 0.0                                                                                     | 17.524                                                | 30.86                                                                     |                                                                     | 0.460                                  |                                                   |                                                                                                     |                                                                                                       |
| US                           | 969                                                                      | 41.08                                                                   | 7.38                                                                                                                        | 0.459                              | 41.07                                                   | -0.017                                                         | 0.0                                                                                     | 17.509                                                | 37.61                                                                     |                                                                     | 0.459                                  |                                                   |                                                                                                     |                                                                                                       |
|                              | 983                                                                      | 48.22                                                                   | 7.45                                                                                                                        | 0.458                              | 48.21                                                   | -0.017                                                         | 0.0                                                                                     | 17.496                                                | 44.65                                                                     |                                                                     | 0.458                                  |                                                   | -421.77                                                                                             |                                                                                                       |
|                              | 997                                                                      | 55.53                                                                   | 7.53                                                                                                                        | 0.456                              | 55.52                                                   | -0.017                                                         | 0.0                                                                                     | 17.481                                                | 51.87                                                                     |                                                                     | 0.457                                  |                                                   | -846.02                                                                                             |                                                                                                       |
|                              | 1011                                                                     | 62.98                                                                   | 7.60                                                                                                                        | 0.455                              | 62.97                                                   | -0.017                                                         | 0.0                                                                                     | 17.467                                                | 59.26                                                                     |                                                                     | 0.456                                  |                                                   | -1316.13                                                                                            |                                                                                                       |

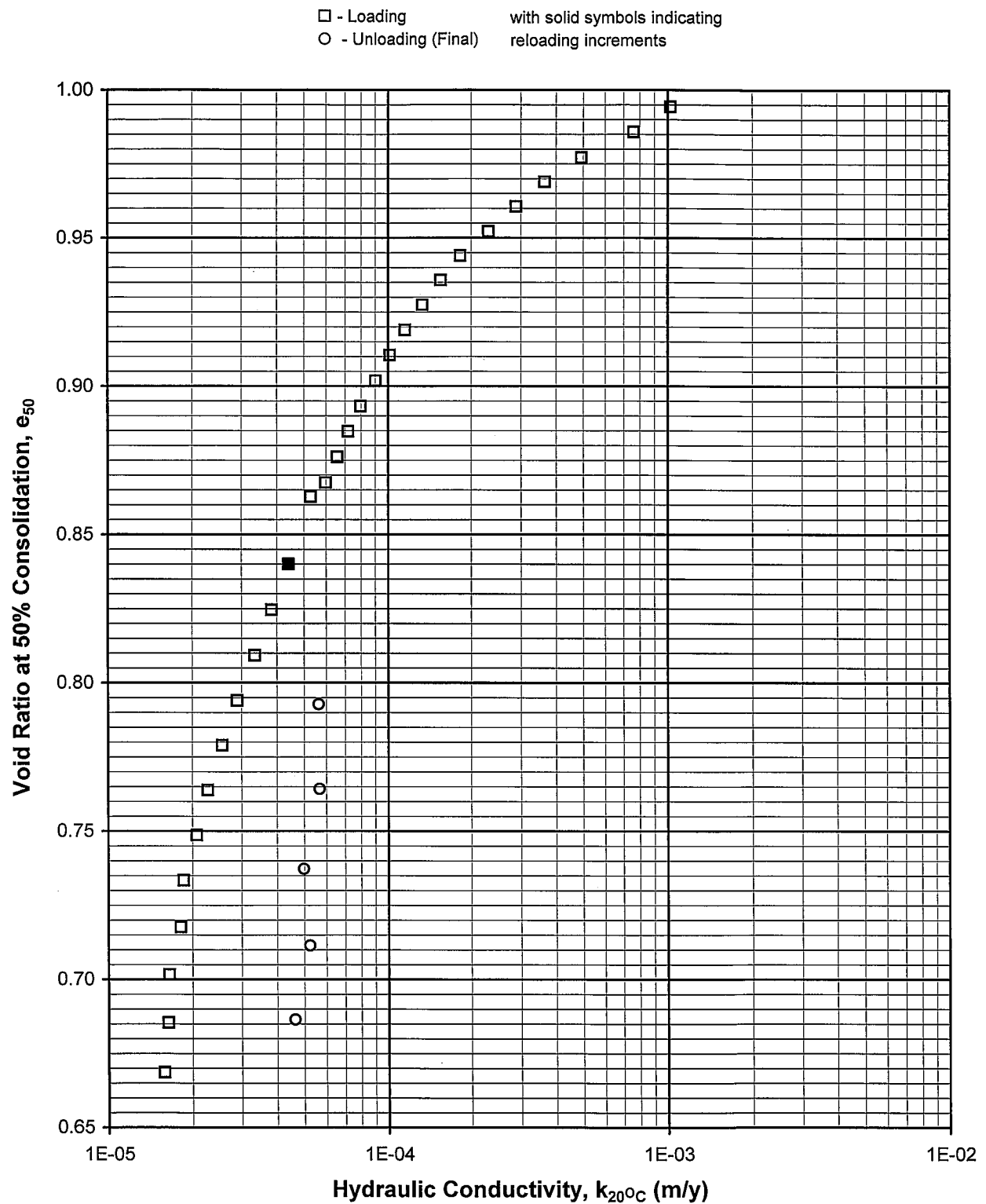
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**1-D CONSOLIDATION TEST: CRS**  
 Sample No. UD-20A - Depth 120.0 - 121.7 ft  
 Boring B-2359UD

KAW 7/16/08



**1-D CONSOLIDATION TEST: CRS**  
Sample No. UD-20A - Depth 120.0 - 121.7 ft  
Boring B-2359UD

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2359\_UD20a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Meas. ; ☐ Assumed Ring No.: 2  
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area,  $A_r$  (cm<sup>2</sup>) = 31.695  
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA  
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

|                                                    |                                           |                                |                                   |                                  |                                 |                         |
|----------------------------------------------------|-------------------------------------------|--------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping | Constant Effort:                | Blows/Tamps per Layer = |
| Boring No.: B-2359UD                               | <input type="checkbox"/> LPC Core         |                                |                                   | Impact/Rammer                    | Rammer Wgt. (lb) =              | No. Layers =            |
| Sample No.: UD-20                                  | Composite No.:                            |                                |                                   | Pluviated:                       | Tamper Force (lb) =             | Drop (in.) =            |
| Depth (ft): 120.0 - 121.7                          | Specimen No.: A                           |                                |                                   | Kneading                         | Undercompaction: $U_{ni}$ (%) = | Dia. (in.) =            |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                |                                   |                                  | Ref. Effort =                   | % Comp. = $\pm$ Opt. =  |

| Water Content (W);                             |                                                          | Initial - Trimming Location |                                     |            | Final, W <sub>at</sub><br>(see below) | Soil and Ring Masses                                       | Initial | Final  |
|------------------------------------------------|----------------------------------------------------------|-----------------------------|-------------------------------------|------------|---------------------------------------|------------------------------------------------------------|---------|--------|
|                                                |                                                          | Top (W1)                    | Bottom (W2)                         | Sides (W3) |                                       | Mass Moist Soil + Ring (g)                                 | 325.41  | 320.48 |
| Container No.                                  |                                                          | 136                         | 801                                 | 986        | 907                                   | Mass Ring (g)                                              | 212.92  |        |
| Mass Moist Soil + Container (g)                |                                                          | 110.58                      | 118.02                              | 95.45      | 62.90                                 | Mass Moist Soil, M <sub>t,o</sub> or M <sub>t,at</sub> (g) | 112.49  | 107.56 |
| Mass Dry Soil + Container (g)                  |                                                          | 90.17                       | 96.21                               | 79.39      | 55.30                                 | EXCESS DRY SOIL (soil not incl. in final mass above)       |         |        |
| Mass Container (g)                             |                                                          | 30.13                       | 31.81                               | 32.23      | 31.93                                 | Container No.                                              |         | 2016   |
| WATER CONTENT (%)                              |                                                          | 33.99                       | 33.87                               | 34.05      | 32.52                                 | Mass Dry Soil + Container (g)                              |         | 32.64  |
| Avg. Initial Water Content, W <sub>4</sub> (%) |                                                          | 33.97                       | Final W <sub>at</sub> : X   Slice ; |            | Whole Spec.                           | Mass Container (g)                                         |         | 30.71  |
|                                                | See attached data sheet(s) for additional water contents |                             |                                     |            |                                       | Mass Excess Dry Soil, M <sub>d,es</sub> (g)                |         | 1.93   |

| Soil Height: Measurements (mm)                                                                                                                                               |                                                                       |                                                                       |                                                                       | Soil Height: Calculations, (mm)                         |                                                                     | Initial | Final  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------|--------|
| Initial                                                                                                                                                                      |                                                                       | Final                                                                 |                                                                       | Height of Gauge Block, $H_{gb}$ (1)                     |                                                                     | 0.000   | 19.060 |
| with Spec.                                                                                                                                                                   | without Spec.                                                         | with Spec.                                                            | without Spec.                                                         | Reading on Gauge Block, $d_{gb}$                        |                                                                     | 0.000   | 0.000  |
| 19.310                                                                                                                                                                       | 0.000                                                                 | 11.170                                                                | 12.840                                                                | Avg. Reading on Soil, $d_{soil}$                        |                                                                     | 19.260  | 11.142 |
| 19.210                                                                                                                                                                       | 0.000                                                                 | 11.070                                                                | 12.780                                                                | Avg. Reading on Apparatus without Specimen, $d_{app}$   |                                                                     | 0.000   | 12.802 |
| 19.280                                                                                                                                                                       | 0.000                                                                 | 11.150                                                                | 12.800                                                                | Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$ |                                                                     | 19.260  | 17.400 |
| 19.220                                                                                                                                                                       | 0.000                                                                 | 11.190                                                                | 12.810                                                                | Soil Height: Final by Dial Change During Test (mm)      |                                                                     |         |        |
| 19.280                                                                                                                                                                       | 0.000                                                                 | 11.130                                                                | 12.780                                                                | Initial Height, $H_o$                                   |                                                                     | 19.260  |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Require $H_{gb}$ & $d_{gb}$ (1)                         | Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{e,f}$ | 1.722   |        |
| <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No                                                                                                        | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No | <input type="checkbox"/> Yes ; <input checked="" type="checkbox"/> No | Filter Paper Included:                                  | Final Calculated Height, $H_{f,c} = H_o - \Delta H_{e,f}$           | 17.538  |        |
| (1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm |                                                                       |                                                                       |                                                                       |                                                         | Final Soil Height Measurement, $H_{f,m}$                            | 17.400  |        |
| Enter value of $H_{gb}$ & $d_{gb}$ only when that value has to be included in the determination of the soil height.                                                          |                                                                       |                                                                       |                                                                       |                                                         | Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$               | 0.72    |        |

| Estimated Initial Unit Weight                                                                         |        |                             |       | Soil Extruded During Loading                            |      |
|-------------------------------------------------------------------------------------------------------|--------|-----------------------------|-------|---------------------------------------------------------|------|
| Total, $\gamma_{t,o}$ (pcf) =                                                                         | 115.04 | Dry, $\gamma_{d,o}$ (pcf) = | 85.87 | Container No.                                           |      |
| Filter Paper Used: <input checked="" type="checkbox"/> Whatman No. 54; <input type="checkbox"/> Other |        |                             |       | Mass Dry Soil + Cont. (g)                               | NA   |
| Incremental Test: Top & Bottom: <input type="checkbox"/> Yes ; <input type="checkbox"/> No            |        |                             |       | Mass Cont. (g)                                          | NA   |
| CRS Test: Top Only: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No             |        |                             |       | Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g) | 0.00 |

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Gray Fat CLAY (CH)

Trimming/Etc. Remarks: Excessive soil extrusions during testing

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other  
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw  
 Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: LF Take Down By: JTG  
 Date: 4/1/2008 Date: 4/1/2008 Final Calc. By: LF Date: 4/7/2008  
 Reviewed By: HP HP

Note: NA - Not Applicable

KAW 7/16/08

# ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2359\_UD20a  
 Task No.: NA Specific Gravity,  $G_s$ : 2.720 ☒ Measured ; ☐ Assumed.  
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = \_\_\_\_\_ g/kg

| Cal.-<br>Routine | ITEM                  | Water<br>Content,<br>(%) | Mass<br>Dry Soil,<br>(g) | Degree of Saturation, S in % |                       |      |
|------------------|-----------------------|--------------------------|--------------------------|------------------------------|-----------------------|------|
|                  |                       |                          |                          | Height<br>Initial            | Final Height<br>Meas. | Dial |
| 1                | Initial, Top, W1      | 33.99                    | 83.95                    | 94.9                         | 97.6                  | 95.9 |
| 2                | " Bottom, W2          | 33.87                    | 84.03                    | 94.7                         | 97.4                  | 95.7 |
| 3                | " Sides, W3           | 34.05                    | 83.91                    | 95.0                         | 97.7                  | 96.0 |
| 4                | " Average, W4         | 33.97                    | 83.97                    | 94.9                         | 97.6                  | 95.8 |
| 5                | " Back Calculated (1) | 35.38                    | 83.09 (3)                | 96.7                         | 99.9                  | 98.1 |
| 6                | Final                 | 32.52                    | 83.09 (2)                | 96.7                         | 99.9                  | 98.1 |

|                                                                                                             |                                |
|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Calculated Specific Gravity for Final Saturation = 100%:</b>                                             |                                |
| Used Cal. Routine No. 5                                                                                     | to obtain the mass of dry soil |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |                                |
| Back Cal. $G_s$ = 2.717                                                                                     |                                |
| Avg. $G_s$ (measured/assumed) & Back Cal. $G_s$ = 2.718                                                     |                                |

|                                                                                 |         |
|---------------------------------------------------------------------------------|---------|
| Calculation Constant, K<br>= (unit conversion) / $G_s \times \rho_w \times A_r$ |         |
| Estimated, $K_s$                                                                | 0.11620 |
| Final Selected, $K_r$                                                           | 0.11620 |

|                                                                                                             |  |                              |
|-------------------------------------------------------------------------------------------------------------|--|------------------------------|
| <b>Calculated Mass Dry Soil for Final Saturation = 100%:</b>                                                |  | using measured/assumed $G_s$ |
| and final height by: <input checked="" type="checkbox"/> Measurement; <input type="checkbox"/> Dial Change. |  |                              |
| Back Cal. Mass Dry Soil, (g) = 83.04                                                                        |  |                              |
| Avg. Back Calculated and Measured Mass Dry Soil (g) = 83.07                                                 |  |                              |

| Summary of Specimen Physical Properties |                      |                                              |                                                               |                                                  |                             |  |                                     |                                                                      |                                   |
|-----------------------------------------|----------------------|----------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|-----------------------------|--|-------------------------------------|----------------------------------------------------------------------|-----------------------------------|
| Specific Gravity<br>$G_s$ = 2.720       |                      | <input checked="" type="checkbox"/> Assumed  | To make $S_r$ = 100% at end of test.                          |                                                  |                             |  |                                     |                                                                      |                                   |
|                                         |                      | <input checked="" type="checkbox"/> Measured | Avg. of measured/assumed $G_s$ and $G_s$ to make $S_r$ = 100% |                                                  |                             |  |                                     |                                                                      |                                   |
| Mass Dry Soil, (g)                      | Initial: 83.09       | <input checked="" type="checkbox"/>          | From Cal. Routine No. 5                                       | Note: Routine #5 is based on final measurements. |                             |  |                                     |                                                                      |                                   |
|                                         | Final (4): NA        |                                              | Make $S_r$ = 100%, or;                                        | Avg. of measured & make $S_r$ = 100%             |                             |  |                                     |                                                                      |                                   |
| Initial Height (mm) = 19.26             |                      | <input checked="" type="checkbox"/>          | Measured ;                                                    | Back Calculated Back-cal. Sat. (%) = NA          |                             |  |                                     |                                                                      |                                   |
| Final Height (mm) = 17.40               |                      | <input checked="" type="checkbox"/>          | Measured ;                                                    | Initial $H_o$ & dial change during loading       |                             |  |                                     |                                                                      |                                   |
|                                         | Water Content, w (%) |                                              | Void Ratio, e                                                 |                                                  | Degree of Saturation, S (%) |  | Total Unit Weight, $\gamma_t$ (pcf) |                                                                      | Dry Unit Weight, $\gamma_d$ (pcf) |
|                                         |                      |                                              |                                                               |                                                  |                             |  | Height of Solids, $H_s$ (2,4) (mm)  | Extruded soil loss proportioned in increasing loading increments (5) |                                   |
| Initial                                 | 35.4                 |                                              | 0.995                                                         |                                                  | 96.7                        |  | 115.0                               |                                                                      | 85.0                              |
| Final                                   | 29.4                 |                                              | 0.802                                                         |                                                  | 99.9                        |  | 121.8                               |                                                                      | 94.1                              |

|                        |                   |                                   |       |       |     |                       |    |               |
|------------------------|-------------------|-----------------------------------|-------|-------|-----|-----------------------|----|---------------|
| Graphical Construction | $\sigma'_p$ (ksf) | $\epsilon_a$ (%)                  | CR    | RR    | OCR | Liquid Limit (LL)     | 51 | Minus 200 (%) |
| Casagrande Method      | 40.00             | NA                                | 0.273 | 0.064 | 3.7 | Plastic Limit (PL)    | 15 | 95.4          |
| Becker Method          | NA                | Becker minimum $\sigma'_p$ (ksf): |       |       | NA  | Plasticity Index (PI) | 36 |               |

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil ).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP *HP*

Date: 4/8/2008



**ONE - DIMENSIONAL CONSOLIDATION TEST:  
CALCULATED CRS LOADING DATA**

| Load-<br>ing<br>Info.<br>(1) | Julian<br>Day<br>(dd) | Hour<br>(hr.:min.:s) | Elapsed Time<br>from Start of<br>Loading,<br>$\Delta t_n$<br>(min) | Total<br>Vertical<br>Stress,<br>$\sigma_{v,n}$ (2)<br>(ksf) | Excess<br>Pore-Water<br>Pressure,<br>$\Delta U_n$<br>(ksf) | Total<br>Specimen<br>Deformation,<br>$\Delta H_n$ (3)<br>(mm) | Apparatus<br>Flexibility<br>Correction,<br>$\Delta d_{afc,n}$<br>(mm) | Corr. Total<br>Specimen<br>Deformation,<br>$\Delta H_{c,n}$ (4)<br>(mm) | Strain Rate,<br>between<br>n & n-1,<br>$\Delta \epsilon_{ac,rate}$<br>(%/hr) |
|------------------------------|-----------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|
| UE                           | 94                    | 01 : 26 : 00         | 979                                                                | 64.47                                                       | 27.644                                                     | 1.928                                                         | 0.453                                                                 | 1.475                                                                   | 0.462                                                                        |
|                              | 94                    | 01 : 46 : 00         | 999                                                                | 60.21                                                       | 22.665                                                     | 1.942                                                         | 0.443                                                                 | 1.499                                                                   | 0.376                                                                        |
|                              | 94                    | 04 : 00 : 00         | 1133                                                               | 36.95                                                       | -1.948                                                     | 1.905                                                         | 0.380                                                                 | 1.524                                                                   | 0.059                                                                        |
|                              | 94                    | 05 : 32 : 00         | 1225                                                               | 29.20                                                       | -5.499                                                     | 1.849                                                         | 0.356                                                                 | 1.493                                                                   | -0.104                                                                       |
|                              | 94                    | 07 : 34 : 00         | 1347                                                               | 20.50                                                       | -7.823                                                     | 1.758                                                         | 0.324                                                                 | 1.434                                                                   | -0.151                                                                       |
| US                           | 94                    | 09 : 36 : 00         | 1469                                                               | 14.82                                                       | -8.507                                                     | 1.643                                                         | 0.300                                                                 | 1.343                                                                   | -0.232                                                                       |
|                              | 94                    | 11 : 38 : 00         | 1591                                                               | 10.32                                                       | -9.028                                                     | 1.531                                                         | 0.276                                                                 | 1.255                                                                   | -0.225                                                                       |
|                              | 94                    | 13 : 40 : 00         | 1713                                                               | 6.82                                                        | -9.145                                                     | 1.421                                                         | 0.253                                                                 | 1.168                                                                   | -0.222                                                                       |
|                              | 94                    | 15 : 42 : 00         | 1835                                                               | 4.59                                                        | -8.583                                                     | 1.303                                                         | 0.233                                                                 | 1.070                                                                   | -0.250                                                                       |
|                              | 94                    | 17 : 44 : 00         | 1957                                                               | 2.65                                                        | -7.983                                                     | 1.175                                                         | 0.207                                                                 | 0.968                                                                   | -0.261                                                                       |
|                              | 94                    | 19 : 46 : 00         | 2079                                                               | 1.55                                                        | -6.966                                                     | 1.051                                                         | 0.182                                                                 | 0.869                                                                   | -0.253                                                                       |
| UE                           | 94                    | 21 : 48 : 00         | 2201                                                               | 0.73                                                        | -5.992                                                     | 0.917                                                         | 0.148                                                                 | 0.769                                                                   | -0.256                                                                       |
|                              | 94                    | 22 : 02 : 00         | 2215                                                               | 0.71                                                        | -5.839                                                     | 0.902                                                         | 0.147                                                                 | 0.755                                                                   | -0.305                                                                       |
|                              | 94                    | 22 : 26 : 00         | 2239                                                               | 2.71                                                        | -3.878                                                     | 0.918                                                         | 0.208                                                                 | 0.710                                                                   | -0.585                                                                       |
|                              | 94                    | 23 : 42 : 00         | 2315                                                               | 10.05                                                       | 3.388                                                      | 1.035                                                         | 0.275                                                                 | 0.760                                                                   | 0.205                                                                        |
|                              | 95                    | 01 : 20 : 00         | 2413                                                               | 19.35                                                       | 9.862                                                      | 1.199                                                         | 0.319                                                                 | 0.879                                                                   | 0.378                                                                        |
| US                           | 95                    | 02 : 58 : 00         | 2511                                                               | 28.46                                                       | 15.190                                                     | 1.371                                                         | 0.353                                                                 | 1.018                                                                   | 0.442                                                                        |
|                              | 95                    | 04 : 36 : 00         | 2609                                                               | 37.94                                                       | 20.111                                                     | 1.547                                                         | 0.383                                                                 | 1.163                                                                   | 0.462                                                                        |
|                              | 95                    | 06 : 14 : 00         | 2707                                                               | 47.53                                                       | 24.226                                                     | 1.723                                                         | 0.410                                                                 | 1.313                                                                   | 0.474                                                                        |
|                              | 95                    | 07 : 52 : 00         | 2805                                                               | 57.72                                                       | 28.051                                                     | 1.902                                                         | 0.437                                                                 | 1.465                                                                   | 0.484                                                                        |
|                              | 95                    | 09 : 30 : 00         | 2903                                                               | 67.29                                                       | 30.862                                                     | 2.076                                                         | 0.463                                                                 | 1.614                                                                   | 0.473                                                                        |
|                              | 95                    | 11 : 08 : 00         | 3001                                                               | 77.40                                                       | 35.080                                                     | 2.256                                                         | 0.495                                                                 | 1.761                                                                   | 0.467                                                                        |
|                              | 95                    | 12 : 46 : 00         | 3099                                                               | 86.89                                                       | 39.415                                                     | 2.432                                                         | 0.524                                                                 | 1.908                                                                   | 0.467                                                                        |
|                              | 95                    | 14 : 24 : 00         | 3197                                                               | 96.91                                                       | 44.375                                                     | 2.608                                                         | 0.553                                                                 | 2.054                                                                   | 0.466                                                                        |
|                              | 95                    | 16 : 02 : 00         | 3295                                                               | 107.05                                                      | 49.346                                                     | 2.780                                                         | 0.582                                                                 | 2.199                                                                   | 0.459                                                                        |
|                              | 95                    | 17 : 40 : 00         | 3393                                                               | 117.68                                                      | 54.676                                                     | 2.953                                                         | 0.610                                                                 | 2.343                                                                   | 0.458                                                                        |
|                              | 95                    | 19 : 18 : 00         | 3491                                                               | 129.08                                                      | 60.513                                                     | 3.125                                                         | 0.639                                                                 | 2.486                                                                   | 0.456                                                                        |
|                              | 95                    | 20 : 56 : 00         | 3589                                                               | 140.46                                                      | 66.239                                                     | 3.299                                                         | 0.666                                                                 | 2.633                                                                   | 0.466                                                                        |
|                              | 95                    | 22 : 34 : 00         | 3687                                                               | 151.97                                                      | 71.543                                                     | 3.472                                                         | 0.693                                                                 | 2.778                                                                   | 0.462                                                                        |
|                              | 96                    | 00 : 12 : 00         | 3785                                                               | 162.54                                                      | 76.178                                                     | 3.650                                                         | 0.717                                                                 | 2.933                                                                   | 0.492                                                                        |
|                              | 96                    | 01 : 50 : 00         | 3883                                                               | 173.52                                                      | 79.407                                                     | 3.826                                                         | 0.741                                                                 | 3.084                                                                   | 0.481                                                                        |
|                              | 96                    | 03 : 28 : 00         | 3981                                                               | 182.76                                                      | 81.125                                                     | 4.004                                                         | 0.761                                                                 | 3.243                                                                   | 0.504                                                                        |
| UE                           | 96                    | 05 : 06 : 00         | 4079                                                               | 192.25                                                      | 83.236                                                     | 4.185                                                         | 0.781                                                                 | 3.404                                                                   | 0.512                                                                        |
|                              | 96                    | 06 : 44 : 00         | 4177                                                               | 200.95                                                      | 84.793                                                     | 4.359                                                         | 0.799                                                                 | 3.561                                                                   | 0.498                                                                        |
|                              | 96                    | 07 : 04 : 00         | 4197                                                               | 202.79                                                      | 84.969                                                     | 4.396                                                         | 0.802                                                                 | 3.593                                                                   | 0.512                                                                        |
|                              | 96                    | 07 : 06 : 00         | 4199                                                               | 202.32                                                      | 84.612                                                     | 4.398                                                         | 0.802                                                                 | 3.597                                                                   | 0.523                                                                        |
|                              | 96                    | 12 : 06 : 00         | 4499                                                               | 144.87                                                      | 13.440                                                     | 4.420                                                         | 0.715                                                                 | 3.705                                                                   | 0.112                                                                        |
|                              | 96                    | 17 : 06 : 00         | 4799                                                               | 98.43                                                       | -9.780                                                     | 4.253                                                         | 0.632                                                                 | 3.621                                                                   | -0.087                                                                       |
|                              | 96                    | 22 : 06 : 00         | 5099                                                               | 67.07                                                       | -11.103                                                    | 4.028                                                         | 0.566                                                                 | 3.463                                                                   | -0.164                                                                       |
| US                           | 97                    | 03 : 06 : 00         | 5399                                                               | 45.22                                                       | -11.157                                                    | 3.776                                                         | 0.510                                                                 | 3.265                                                                   | -0.205                                                                       |
|                              | 97                    | 08 : 06 : 00         | 5699                                                               | 29.78                                                       | -11.297                                                    | 3.505                                                         | 0.464                                                                 | 3.041                                                                   | -0.233                                                                       |
|                              | 97                    | 13 : 06 : 00         | 5999                                                               | 19.14                                                       | -11.357                                                    | 3.213                                                         | 0.425                                                                 | 2.788                                                                   | -0.263                                                                       |



## CALCULATED CRS LOADING DATA

[illegible]

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-2 ☒ Undisturbed or; ☐ Reconstituted - Specimen. File Name: B-2359\_UD20  
 Task No.: NA Date: Start: 4/1/2008 Back Pressure,  $U_{b,CS}$  (psi): 70.8 Piston Uplift,  $P_{up}$  (lbf): 34.80  
 Project Name: Exelon (Victoria) Completed: 4/7/2008 Transient Time Factor,  $T_v = (C_v \cdot t) / H^2 = 0.5$   
☐ Data corrected for salt \_\_\_\_\_; in \_\_\_\_\_ g/kg

Final Description of Specimen: Light Gray Fat CLAY (CH)

Ring No.: 2 Area,  $A_r$  (cm<sup>2</sup>): 31.695 Solids Ht.,  $H_s$  (mm): 9.656 Specific Gravity,  $G_s = 2.720$  ☒ Meas.; ☐ Assumed  
**Initial:** Height  $H_o$ : 19.26 Water 35.4 Void 0.995 Deg. of 96.7 Total Unit 115.0 Dry Unit 85.0  
**Final:** (mm):  $H_f$ : 17.40 Content,  $w$  (%): 29.4 Ratio,  $e$ : 0.802 Sat.,  $S$  (%): 99.9 Weight,  $\gamma_t$  (pcf): 121.8 Weight,  $\gamma_d$  (pcf): 94.1

## Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or  $\Delta U_n$  to errati
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: LF

Reviewed By: HP *HP*

| Loading Info. (1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ( $\epsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                             |                                                         |                               |                                          | Steady State Ratio, $SSR_n = \frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $C_\alpha = \frac{\Delta d_{a,sc}}{H_o}$ ( $\times 10^{-4}$ ) |
|-------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                   |                                                        |                                                          |                                                                                                        |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf) | Coefficient of Consolidation, $C_v$ (m <sup>2</sup> /y) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                            |
| S                 |                                                        |                                                          |                                                                                                        |                           | 0.30                                        |                                                    |                                                                          |                                           | Data on given line represents average conditions           |                                                         |                               |                                          |                                                                                       |                                                                                            |
| BS                |                                                        |                                                          | -0.12                                                                                                  | 0.997                     | 1.26                                        |                                                    |                                                                          | 19.283                                    | between that line and the previous line of data.           |                                                         |                               |                                          |                                                                                       |                                                                                            |
| BE                |                                                        | 1.26                                                     | -0.19                                                                                                  | 0.998                     | 1.24                                        | -0.028                                             | -2.2                                                                     | 19.297                                    |                                                            |                                                         | 0.998                         |                                          |                                                                                       |                                                                                            |
| CS                | 0                                                      | 1.29                                                     | -0.20                                                                                                  | 0.999                     | 1.29                                        | 0.000                                              | 0.0                                                                      | 19.298                                    |                                                            |                                                         | 0.999                         |                                          |                                                                                       |                                                                                            |
|                   | 26                                                     | 2.41                                                     | -0.10                                                                                                  | 0.997                     | 2.55                                        | 0.213                                              | 8.3                                                                      | 19.280                                    | 1.85                                                       |                                                         | 0.998                         |                                          |                                                                                       |                                                                                            |
|                   | 52                                                     | 3.18                                                     | 0.13                                                                                                   | 0.992                     | 3.44                                        | 0.380                                              | 11.0                                                                     | 19.234                                    | 2.79                                                       |                                                         | 0.994                         |                                          |                                                                                       |                                                                                            |
|                   | 89                                                     | 4.19                                                     | 0.48                                                                                                   | 0.985                     | 4.62                                        | 0.626                                              | 13.6                                                                     | 19.167                                    | 3.68                                                       |                                                         | 0.988                         |                                          |                                                                                       |                                                                                            |
| US                | 141                                                    | 5.62                                                     | 0.90                                                                                                   | 0.977                     | 6.45                                        | 1.211                                              | 18.8                                                                     | 19.086                                    | 4.90                                                       |                                                         | 0.981                         |                                          |                                                                                       |                                                                                            |
|                   | 193                                                    | 7.26                                                     | 1.31                                                                                                   | 0.969                     | 8.57                                        | 1.892                                              | 22.1                                                                     | 19.008                                    | 6.44                                                       | 2.25                                                    | 0.973                         | 1.02E-03                                 | 1.23                                                                                  |                                                                                            |
|                   | 245                                                    | 9.04                                                     | 1.76                                                                                                   | 0.960                     | 10.90                                       | 2.675                                              | 24.5                                                                     | 18.922                                    | 8.15                                                       | 1.63                                                    | 0.964                         | 7.59E-04                                 | 1.80                                                                                  |                                                                                            |
|                   | 297                                                    | 11.03                                                    | 2.16                                                                                                   | 0.951                     | 13.68                                       | 3.766                                              | 27.5                                                                     | 18.843                                    | 10.03                                                      | 1.35                                                    | 0.956                         | 4.93E-04                                 | 2.24                                                                                  |                                                                                            |
|                   | 349                                                    | 13.20                                                    | 2.57                                                                                                   | 0.943                     | 16.68                                       | 4.932                                              | 29.6                                                                     | 18.765                                    | 12.12                                                      | 1.05                                                    | 0.947                         | 3.64E-04                                 | 2.35                                                                                  |                                                                                            |
|                   | 401                                                    | 15.48                                                    | 2.99                                                                                                   | 0.935                     | 19.90                                       | 6.246                                              | 31.4                                                                     | 18.684                                    | 14.34                                                      | 0.86                                                    | 0.939                         | 2.88E-04                                 | 2.42                                                                                  |                                                                                            |
|                   | 453                                                    | 17.80                                                    | 3.40                                                                                                   | 0.927                     | 23.21                                       | 7.615                                              | 32.8                                                                     | 18.605                                    | 16.64                                                      | 0.70                                                    | 0.931                         | 2.30E-04                                 | 2.38                                                                                  |                                                                                            |
|                   | 505                                                    | 20.22                                                    | 3.80                                                                                                   | 0.919                     | 26.84                                       | 9.282                                              | 34.6                                                                     | 18.527                                    | 19.01                                                      | 0.61                                                    | 0.923                         | 1.83E-04                                 | 2.47                                                                                  |                                                                                            |
|                   | 557                                                    | 22.70                                                    | 4.22                                                                                                   | 0.911                     | 30.60                                       | 11.045                                             | 36.1                                                                     | 18.448                                    | 21.46                                                      | 0.52                                                    | 0.915                         | 1.55E-04                                 | 2.40                                                                                  |                                                                                            |
|                   | 609                                                    | 25.27                                                    | 4.64                                                                                                   | 0.902                     | 34.60                                       | 13.011                                             | 37.6                                                                     | 18.367                                    | 23.98                                                      | 0.46                                                    | 0.906                         | 1.33E-04                                 | 2.40                                                                                  |                                                                                            |

# ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

| Loading Info.<br>(1) | Elapsed Time from Start of Loading, $\Delta t_n$ (min) | Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf) | Corrected Volumetric (Axial) Strain, $\varepsilon_{v,n}$ ( $\varepsilon_{ac,n}$ ) $\Delta H_{c,n} / H_o$ (%) | Overall Void Ratio, $e_n$ | Total Vertical Stress, $\sigma_{v,n}$ (ksf) | Excess Pore-Water Pressure, $\Delta U_n$ (2) (ksf) | Loading Pore-Water Pressure Ratio, $R_u$ $\Delta U_n / \sigma_{v,n}$ (%) | Corrected Specimen Height, $H_{c,n}$ (mm) | Calculations Between n and n-1                             |                                                         |                               |                                          | Steady State Ratio, $SSR_n = \frac{c_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$ | Rate of Secondary Comp. (3), $C_\alpha = \frac{\Delta d_{a,sc}}{H_o} (\times 10^{-4})$ |
|----------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|                      |                                                        |                                                          |                                                                                                              |                           |                                             |                                                    |                                                                          |                                           | Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf) | Coefficient of Consolidation, $c_v$ (m <sup>2</sup> /y) | Average Void Ratio, $e_{avg}$ | Hydraulic Conductivity, $k$ @ 20°C (m/y) |                                                                                       |                                                                                        |
|                      | 661                                                    | 27.80                                                    | 5.06                                                                                                         | 0.894                     | 38.42                                       | 14.761                                             | 38.4                                                                     | 18.286                                    | 26.54                                                      | 0.37                                                    | 0.898                         | 1.15E-04                                 | 2.18                                                                                  |                                                                                        |
|                      | 713                                                    | 30.41                                                    | 5.48                                                                                                         | 0.885                     | 42.45                                       | 16.723                                             | 39.4                                                                     | 18.204                                    | 29.10                                                      | 0.34                                                    | 0.890                         | 1.01E-04                                 | 2.23                                                                                  |                                                                                        |
|                      | 765                                                    | 33.04                                                    | 5.91                                                                                                         | 0.877                     | 46.56                                       | 18.727                                             | 40.2                                                                     | 18.122                                    | 31.72                                                      | 0.30                                                    | 0.881                         | 9.02E-05                                 | 2.18                                                                                  |                                                                                        |
|                      | 817                                                    | 35.72                                                    | 6.33                                                                                                         | 0.868                     | 50.72                                       | 20.752                                             | 40.9                                                                     | 18.041                                    | 34.38                                                      | 0.27                                                    | 0.873                         | 7.97E-05                                 | 2.14                                                                                  |                                                                                        |
|                      | 869                                                    | 38.47                                                    | 6.75                                                                                                         | 0.860                     | 55.05                                       | 22.894                                             | 41.6                                                                     | 17.959                                    | 37.09                                                      | 0.25                                                    | 0.864                         | 7.17E-05                                 | 2.15                                                                                  |                                                                                        |
|                      | 921                                                    | 41.21                                                    | 7.18                                                                                                         | 0.851                     | 59.34                                       | 24.989                                             | 42.1                                                                     | 17.877                                    | 39.84                                                      | 0.22                                                    | 0.856                         | 6.57E-05                                 | 2.07                                                                                  |                                                                                        |
|                      | 973                                                    | 44.05                                                    | 7.61                                                                                                         | 0.843                     | 63.95                                       | 27.396                                             | 42.8                                                                     | 17.794                                    | 42.63                                                      | 0.22                                                    | 0.847                         | 5.97E-05                                 | 2.16                                                                                  |                                                                                        |
| UE                   | 979                                                    | 44.38                                                    | 7.66                                                                                                         | 0.842                     | 64.47                                       | 27.644                                             | 42.9                                                                     | 17.785                                    | 44.21                                                      | 0.20                                                    | 0.842                         | 5.29E-05                                 | 2.01                                                                                  |                                                                                        |
|                      | 999                                                    | 43.95                                                    | 7.78                                                                                                         | 0.839                     | 60.21                                       | 22.665                                             | 37.6                                                                     | 17.761                                    | 44.16                                                      |                                                         | 0.841                         |                                          |                                                                                       |                                                                                        |
|                      | 1133                                                   | 38.24                                                    | 7.91                                                                                                         | 0.837                     | 36.95                                       | -1.948                                             | -5.3                                                                     | 17.736                                    | 41.09                                                      |                                                         | 0.838                         |                                          |                                                                                       |                                                                                        |
|                      | 1225                                                   | 32.76                                                    | 7.75                                                                                                         | 0.840                     | 29.20                                       | -5.499                                             | -18.8                                                                    | 17.767                                    | 35.50                                                      |                                                         | 0.838                         |                                          |                                                                                       |                                                                                        |
|                      | 1347                                                   | 25.43                                                    | 7.45                                                                                                         | 0.846                     | 20.50                                       | -7.823                                             | -38.2                                                                    | 17.826                                    | 29.09                                                      |                                                         | 0.843                         |                                          |                                                                                       |                                                                                        |
| US                   | 1469                                                   | 20.05                                                    | 6.97                                                                                                         | 0.856                     | 14.82                                       | -8.507                                             | -57.4                                                                    | 17.917                                    | 22.74                                                      |                                                         | 0.851                         |                                          |                                                                                       |                                                                                        |
|                      | 1591                                                   | 15.69                                                    | 6.52                                                                                                         | 0.865                     | 10.32                                       | -9.028                                             | -87.5                                                                    | 18.005                                    | 17.87                                                      |                                                         | 0.860                         |                                          | 0.68                                                                                  |                                                                                        |
|                      | 1713                                                   | 12.02                                                    | 6.07                                                                                                         | 0.874                     | 6.82                                        | -9.145                                             | -134.1                                                                   | 18.092                                    | 13.85                                                      | 0.40                                                    | 0.869                         | 6.46E-05                                 | 1.15                                                                                  |                                                                                        |
|                      | 1835                                                   | 9.27                                                     | 5.56                                                                                                         | 0.884                     | 4.59                                        | -8.583                                             | -187.0                                                                   | 18.190                                    | 10.65                                                      | 0.30                                                    | 0.879                         | 7.36E-05                                 | 1.27                                                                                  |                                                                                        |
|                      | 1957                                                   | 6.69                                                     | 5.03                                                                                                         | 0.894                     | 2.65                                        | -7.983                                             | -300.9                                                                   | 18.292                                    | 7.98                                                       | 0.33                                                    | 0.889                         | 8.17E-05                                 | 1.84                                                                                  |                                                                                        |
|                      | 2079                                                   | 4.82                                                     | 4.51                                                                                                         | 0.905                     | 1.55                                        | -6.966                                             | -450.5                                                                   | 18.391                                    | 5.76                                                       | 0.26                                                    | 0.899                         | 8.71E-05                                 | 1.78                                                                                  |                                                                                        |
| UE                   | 2201                                                   | 3.21                                                     | 3.99                                                                                                         | 0.915                     | 0.73                                        | -5.992                                             | -816.7                                                                   | 18.491                                    | 4.02                                                       | 0.29                                                    | 0.910                         | 1.02E-04                                 | 2.36                                                                                  |                                                                                        |
|                      | 2215                                                   | 3.12                                                     | 3.92                                                                                                         | 0.916                     | 0.71                                        | -5.839                                             | -821.0                                                                   | 18.505                                    | 3.17                                                       |                                                         | 0.916                         |                                          |                                                                                       |                                                                                        |
|                      | 2239                                                   | 4.90                                                     | 3.69                                                                                                         | 0.921                     | 2.71                                        | -3.878                                             | -142.9                                                                   | 18.550                                    | 4.01                                                       |                                                         | 0.919                         |                                          |                                                                                       |                                                                                        |
|                      | 2315                                                   | 7.64                                                     | 3.95                                                                                                         | 0.916                     | 10.05                                       | 3.388                                              | 33.7                                                                     | 18.500                                    | 6.27                                                       |                                                         | 0.919                         |                                          |                                                                                       |                                                                                        |
|                      | 2413                                                   | 12.03                                                    | 4.56                                                                                                         | 0.904                     | 19.35                                       | 9.862                                              | 51.0                                                                     | 18.381                                    | 9.83                                                       |                                                         | 0.910                         |                                          |                                                                                       |                                                                                        |
| US                   | 2511                                                   | 17.11                                                    | 5.29                                                                                                         | 0.889                     | 28.46                                       | 15.190                                             | 53.4                                                                     | 18.242                                    | 14.57                                                      |                                                         | 0.896                         |                                          |                                                                                       |                                                                                        |
|                      | 2609                                                   | 22.94                                                    | 6.04                                                                                                         | 0.874                     | 37.94                                       | 20.111                                             | 53.0                                                                     | 18.097                                    | 20.03                                                      |                                                         | 0.882                         |                                          | 0.38                                                                                  |                                                                                        |
|                      | 2707                                                   | 29.55                                                    | 6.82                                                                                                         | 0.859                     | 47.53                                       | 24.226                                             | 51.0                                                                     | 17.947                                    | 26.24                                                      |                                                         | 0.866                         |                                          | 0.62                                                                                  |                                                                                        |
|                      | 2805                                                   | 37.04                                                    | 7.61                                                                                                         | 0.843                     | 57.72                                       | 28.051                                             | 48.6                                                                     | 17.795                                    | 33.30                                                      |                                                         | 0.851                         |                                          | 0.85                                                                                  |                                                                                        |
|                      | 2903                                                   | 44.70                                                    | 8.38                                                                                                         | 0.828                     | 67.29                                       | 30.862                                             | 45.9                                                                     | 17.646                                    | 40.87                                                      |                                                         | 0.835                         |                                          | 0.96                                                                                  |                                                                                        |
|                      | 3001                                                   | 51.76                                                    | 9.14                                                                                                         | 0.812                     | 77.40                                       | 35.080                                             | 45.3                                                                     | 17.499                                    | 48.23                                                      | 0.19                                                    | 0.820                         | 4.39E-05                                 | 1.15                                                                                  |                                                                                        |
|                      | 3099                                                   | 58.07                                                    | 9.91                                                                                                         | 0.797                     | 86.89                                       | 39.415                                             | 45.4                                                                     | 17.352                                    | 54.92                                                      | 0.16                                                    | 0.805                         | 3.83E-05                                 | 1.15                                                                                  |                                                                                        |

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# **Hydraulic Conductivity Tests**



## HYDRAULIC CONDUCTIVITY

|                    |                                    |             |           |
|--------------------|------------------------------------|-------------|-----------|
| Project No.        | 6468-07-1777                       | Tested By   | HJ        |
| Project Name       | Exelon Texas COL (Victoria)        | Test Date   | 4/21/2008 |
| Boring No.         | B-2319UD                           | Reviewed By | SW        |
| Sample No.         | UD-3                               | Review Date | 5/7/08    |
| Sample Depth       | 11-13 Ft (Bottom)                  | Lab No.     | 8353      |
| Sample Description | Pale Yellow Silty SAND (SM) Visual |             |           |

### ASTM D5084-03 - (Method C Falling Head Rising Tail)

|                                        |          |
|----------------------------------------|----------|
| Sample Type:                           | UD       |
| Sample Orientation:                    | Vertical |
| Initial Water Content, %:              | 8.7      |
| Wet Unit Weight, pcf:                  | 111.7    |
| Dry Unit Weight, pcf:                  | 102.8    |
| Compaction, %:                         | N/A      |
| Hydraulic Conductivity, cm/sec. @20 °C | 8.5E-04  |

Remarks: B Value = 0.98

KAW 5/9/08

**PERMEABILITY TEST**  
(ASTM D5084 - 03) (Method C, Increasing Tailwater Level)



Project Number 6468-07-1777 Tested By HJ  
Project Name Exelon Texas COL (Victoria) Test Date 04/21/08  
Boring No. B-2319UD Reviewed By SW  
Sample No. UD-3 Review Date 5/2/08  
Sample Depth 11-13 Ft (Bottom) Lab No. 8353  
Sample Description Pale Yellow Silty SAND (SM) Visual

| Initial Sample Data     |        |                     |        | Final Sample Data       |        |
|-------------------------|--------|---------------------|--------|-------------------------|--------|
| Length, in              |        | Diameter, in        |        | Pan No.                 | AB-23  |
| Location 1              | 3.348  | Location 1          | 2.736  | Wet Soil+Pan, g         | 735.26 |
| Location 2              | 3.350  | Location 2          | 2.729  | Dry Soil + Pan, g       | 613.06 |
| Location 3              | 3.348  | Location 3          | 2.732  | Pan Weight, g           | 83.60  |
| Average                 | 3.349  | Average             | 2.732  | Moisture Content, %     | 23.1   |
| Volume, in <sup>3</sup> | 19.63  | Wet Soil + Tare, g  | 575.85 | Dry Unit Weight, pcf    | 104.0  |
| SG Measured             | 2.72   | Tare Weight, g      | 0.00   | Saturation, %           | 99.3   |
| Soil Sample Wt., g      | 575.85 | Dry Soil + Tare, g  | 530.00 | Diameter, in.           | N/M    |
| Dry UW, pcf             | 102.8  | Moisture Content, % | 8.7    | Length, in.             | N/M    |
| Saturation, %           | 36.2   |                     |        | Volume, in <sup>3</sup> | N/M    |

N/M - not measured due to the nature of sample.

| Consolidation           |       |
|-------------------------|-------|
| Chamber Pressure, psi   | 40    |
| Back Pressure, psi      | 30    |
| Confining Pressure, psi | 10    |
| Initial Burette Reading | 24.5  |
| Final Burette Reading   | 21.0  |
| Volume Change, cc       | 3.5   |
| Permeant used           | Water |

| Time (sec) | H <sub>a</sub> (cm) | H <sub>1</sub> (cm) | H <sub>0</sub> (cm) | H <sub>2</sub> (cm) | Temp (°C) | Initial Hydraulic Gradient | Final Hydraulic Gradient | k cm/sec | k cm/sec at 20 °C |
|------------|---------------------|---------------------|---------------------|---------------------|-----------|----------------------------|--------------------------|----------|-------------------|
| 60         | 6.0                 | 21.1                | 9.0                 | 18.2                | 25.0      | 1.8                        | 1.1                      | 9.28E-04 | 8.26E-04          |
| 120        | 6.0                 | 21.1                | 10.9                | 16.3                | 25.0      | 1.8                        | 0.6                      | 9.63E-04 | 8.57E-04          |
| 180        | 6.0                 | 21.1                | 12.1                | 15.1                | 25.0      | 1.8                        | 0.4                      | 1.01E-03 | 8.98E-04          |
| 60         | 6.5                 | 22.0                | 9.5                 | 19.0                | 25.0      | 1.8                        | 1.1                      | 9.17E-04 | 8.16E-04          |
| 120        | 6.5                 | 22.0                | 11.4                | 17.1                | 25.0      | 1.8                        | 0.7                      | 9.37E-04 | 8.33E-04          |
| 180        | 6.5                 | 22.0                | 12.6                | 15.9                | 25.0      | 1.8                        | 0.4                      | 9.66E-04 | 8.59E-04          |

| No. of Trials | Sample Type | Max. Density (pcf) | Compaction % | Sample Orientation |
|---------------|-------------|--------------------|--------------|--------------------|
| 6             | UD          | N/A                | N/A          | Vertical           |

Avg. k at 20 °C 8.48E-04 cm/sec

a = area of burette in cm<sup>2</sup>  
L = length of sample in cm  
A = area of sample in cm<sup>2</sup>  
Ha = initial inlet head in cm  
H<sub>1</sub> = initial outlet head in cm  
t = time in seconds

H<sub>0</sub> = final inlet head in cm  
H<sub>2</sub> = final outlet head in cm

a = 1.00 cm<sup>2</sup>  
A = 37.83 cm<sup>2</sup>  
L = 8.51 cm

Remarks: B Value = 0.98

# HYDRAULIC CONDUCTIVITY (PERMEABILITY) TEST: Specimen Setup / Take Down

## ASTM D 5084-03

Project Number: 0411-08-1686 Test Type: Permeability Vert. Cell No.: 15 File Name: B-2319\_UD4dV  
 Project Name: Exelon (Victoria) Test Stress(es),  $\sigma'_c$  or  $\sigma'_{vc}$  = 20, NA, NA & NA psi (1)  
 Task No.: NA Perm. Orientation: ☒ Vert.; ☐ Horiz.  $G_s$  = 2.720 ☒ Meas.; ☐ Assumed  
 Test No.: NA Test Series No.: NA Hydraulic System Used: ☒ Hg (CV-FH) ☐ FH (Open System)  
 Part of Hyd. Conductivity Series: ☒ No.; ☐ Yes; if yes with ☐ Vert.; ☐ Horiz.; ☐ Remolded ☐  
 Assig. Remarks: \_\_\_\_\_

|                                                    |                                           |                                        |                                   |                                       |                                                |
|----------------------------------------------------|-------------------------------------------|----------------------------------------|-----------------------------------|---------------------------------------|------------------------------------------------|
| <input checked="" type="checkbox"/> Tube           | <input type="checkbox"/> Field Extruded   | <input type="checkbox"/> Liner         | <input type="checkbox"/> Remolded | <input type="checkbox"/> Tamping      | Constant Effort: Blows/Tamps per Layer = _____ |
| Boring No.: <u>B-2319UD</u>                        | <input type="checkbox"/> Reconstituted    | <input type="checkbox"/> Impact/Rammer |                                   | Rammer Wgt. (lbf) = _____             | No. Layers = _____                             |
| Sample No.: <u>UD4</u>                             | Composite No.: _____                      | <input type="checkbox"/> Pluviated:    |                                   | Tamper Force (lbf) = _____            | Drop (in.) = _____                             |
| Depth (ft): <u>25.0 - 27.0</u>                     | Specimen No.: <u>D</u>                    | <input type="checkbox"/> Kneading      |                                   | Undercompaction: $U_{ni}$ (%) = _____ | Dia. (in.) = _____                             |
| <input type="checkbox"/> Spec. Selection by X-ray; | <input type="checkbox"/> Geomarine Sample |                                        |                                   | Ref. Effort = _____                   | % Comp. = _____ $\pm$ Opt. = _____             |

|                       |                                               |                                            |                                |                                                                                                                          |                     |
|-----------------------|-----------------------------------------------|--------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Type</b>           | <input checked="" type="checkbox"/> Isotropic | <input type="checkbox"/> $K_o$ stress path | <input type="checkbox"/> Rings | Piston: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No                                            | Attached to top cap |
| <b>Consolidation:</b> | <input type="checkbox"/> Anisotropic          | <input type="checkbox"/> 45° stress path   |                                | Piston diameter: <input type="checkbox"/> 1/2"; <input type="checkbox"/> 1/4"; <input checked="" type="checkbox"/> 1/8"; |                     |

| Water Content (WC);                                      | Initial - Trimming Location |                                                                                                     |                     | Final ( $W_{at}$ )<br>(see below) | SOIL MASSES:                                                         | Initial | Final  |
|----------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------|---------------------|-----------------------------------|----------------------------------------------------------------------|---------|--------|
|                                                          | Top ( $W_{o,1}$ )           | Bottom ( $W_{o,2}$ )                                                                                | Sides ( $W_{o,3}$ ) |                                   |                                                                      |         |        |
| Container No                                             | 675                         | 681                                                                                                 |                     | 4123                              | Moist + Tare (etc.) (g):                                             | 593.03  | 604.45 |
| Mass Moist Soil + Cont. (g)                              | 111.22                      | 141.99                                                                                              |                     | 164.04                            | Tare (etc.) (g):                                                     | 0.00    | 0.00   |
| Mass Dry Soil + Cont. (g)                                | 97.59                       | 123.19                                                                                              |                     | 139.32                            | Spec. Moist Mass (g):                                                | 593.03  | 604.45 |
| Mass Container (g)                                       | 31.81                       | 32.10                                                                                               |                     | 30.42                             | EXCESS DRY SOIL (soil stuck to stones, filter paper, membrane, etc.) |         |        |
| Water Content, $W_{o,n}$ (%)                             | 20.72                       | 20.64                                                                                               |                     | 22.70                             | Container No:                                                        |         |        |
| Avg. Initial WC, $W_{o,avg}$ (%)                         | 20.68                       | Final ( $W_{at}$ ); <input checked="" type="checkbox"/> Slice; <input type="checkbox"/> Whole Spec. |                     |                                   | Mass Dry Soil + Container (g):                                       |         |        |
| See attached data sheet(s) for additional water contents |                             |                                                                                                     |                     |                                   | Mass Container (g):                                                  |         |        |
|                                                          |                             |                                                                                                     |                     |                                   | Mass Excess Dry Soil (g):                                            | 0.00    |        |

| Specimen Dimensions                                                                     |        |                    |                                      |       |                    |
|-----------------------------------------------------------------------------------------|--------|--------------------|--------------------------------------|-------|--------------------|
| Height (mm)                                                                             |        |                    | Diameter (mm)                        |       |                    |
| Initial ( $H_o$ )                                                                       |        | Final ( $H_{at}$ ) | Initial ( $D_o$ )                    |       | Final ( $D_{at}$ ) |
| GB                                                                                      | 70.000 | 70.000             | T                                    | 73.00 | 74.00              |
| 1                                                                                       | -1.19  | -0.05              | M                                    | 73.00 | 73.60              |
| 2                                                                                       | -1.28  | 0.12               | B                                    | 73.00 | 73.65              |
| 3                                                                                       | -0.95  | -0.30              | T'                                   |       |                    |
| 4                                                                                       | -1.31  | 0.16               | M'                                   |       |                    |
| 5                                                                                       | -1.26  | -0.24              | B'                                   |       |                    |
| Avg.                                                                                    | 68.80  | 69.94              | Avg.                                 | 73.00 | 73.75              |
| Measuring Devices:                                                                      |        |                    | $A_o$ (cm <sup>2</sup> ) = 41.85     |       |                    |
|                                                                                         |        |                    | $V_o$ (cm <sup>3</sup> ) = 287.96    |       |                    |
|                                                                                         |        |                    | $A_{at}$ (cm <sup>2</sup> ) = 42.72  |       |                    |
|                                                                                         |        |                    | $V_{at}$ (cm <sup>3</sup> ) = 298.76 |       |                    |
| Pi Tape: <input checked="" type="checkbox"/> Dia.                                       |        |                    |                                      |       |                    |
| Calipers: <input type="checkbox"/> Ht.; <input type="checkbox"/> Dia.                   |        |                    |                                      |       |                    |
| Dial Comparator: <input checked="" type="checkbox"/> Ht.; <input type="checkbox"/> Dia. |        |                    |                                      |       |                    |

| Estimated Initial Unit Weight:                |        |
|-----------------------------------------------|--------|
| Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) = | 128.56 |
| Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =   | 106.53 |

| Membrane / Filter Paper / Platens                                                                 |                   |          |
|---------------------------------------------------------------------------------------------------|-------------------|----------|
| Membrane (mm)                                                                                     |                   |          |
| Thickness:                                                                                        | Top               | Bottom   |
| <input type="checkbox"/> Single                                                                   | 0.75              | 0.68     |
| <input checked="" type="checkbox"/> Double                                                        | 0.76              | 0.67     |
| Circumference ( $C_{rm}$ )                                                                        | 216.00            | 216.00   |
| Summary:                                                                                          | Thickness         | Diameter |
| Nominal Value                                                                                     | Average: 0.36     | 68.75    |
| Filter Paper: Top + Bottom: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> No |                   |          |
| Whatman No. 54: <input checked="" type="checkbox"/> Yes ; <input type="checkbox"/> Other:         |                   |          |
| Mass top cap, $M_{tc}$ (g) =                                                                      | ÷ 454 = _____ lbf |          |
| Mass (cap, dial, piston, etc.) (g) =                                                              | NA                | NA lbf   |

NA - Not Applicable; UK - Unknown; GB - Gage Block

Note: (1) Each Test Stress is identified as a Test Stage on other data sheets.

Final Specimen Description (USCS group name & symbol, color, layering, max. part. size, slickensided, fissured, blocky, honeycombed, etc.):  
Light Yellowish Brown Fat CLAY with sand (CH)

☐ Photo taken (internal sliced surface & outside surface)

Other Remarks \_\_\_\_\_

Trimmed / Reconstituted By: RC,jr Setup By: RC,jr Take Down By: RC,jr  
 Date: 3/27/2008 Date: 3/27/2008 Date: 4/9/2008  
 Prelim. Calc. By: RC,jr Calculated By: RC,jr Reviewed By: HP HP

KAW 7/16/08