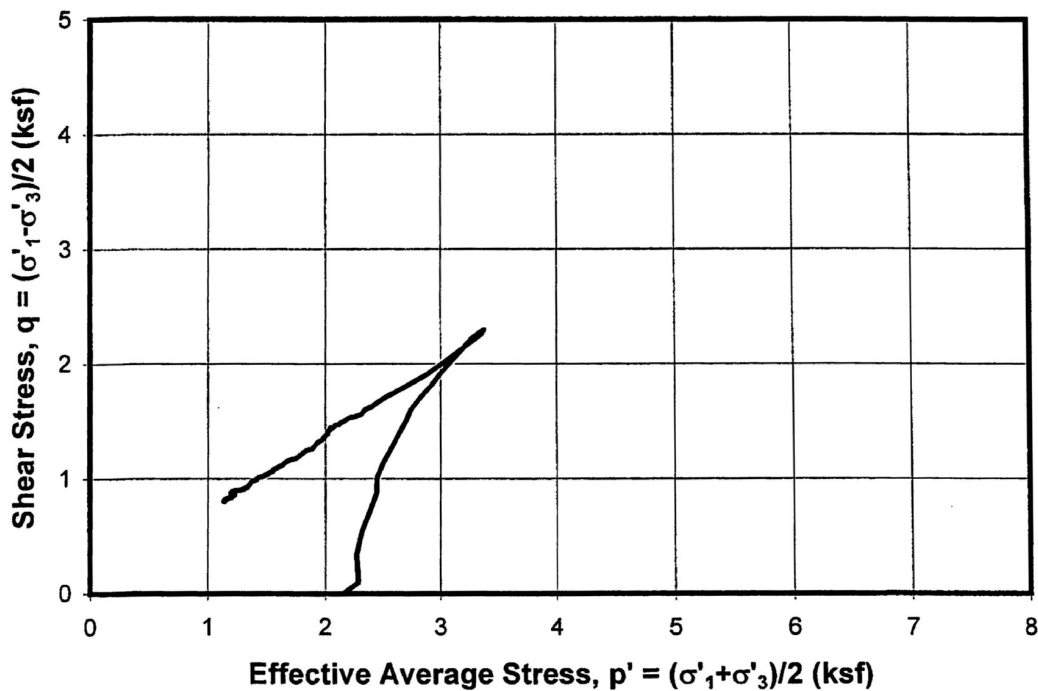
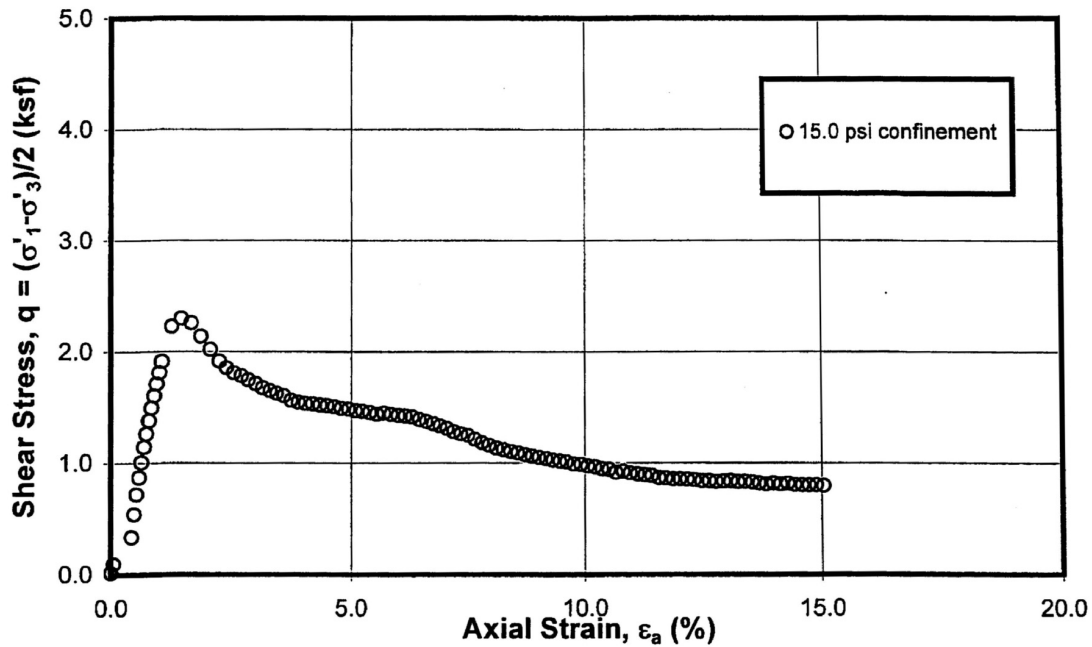




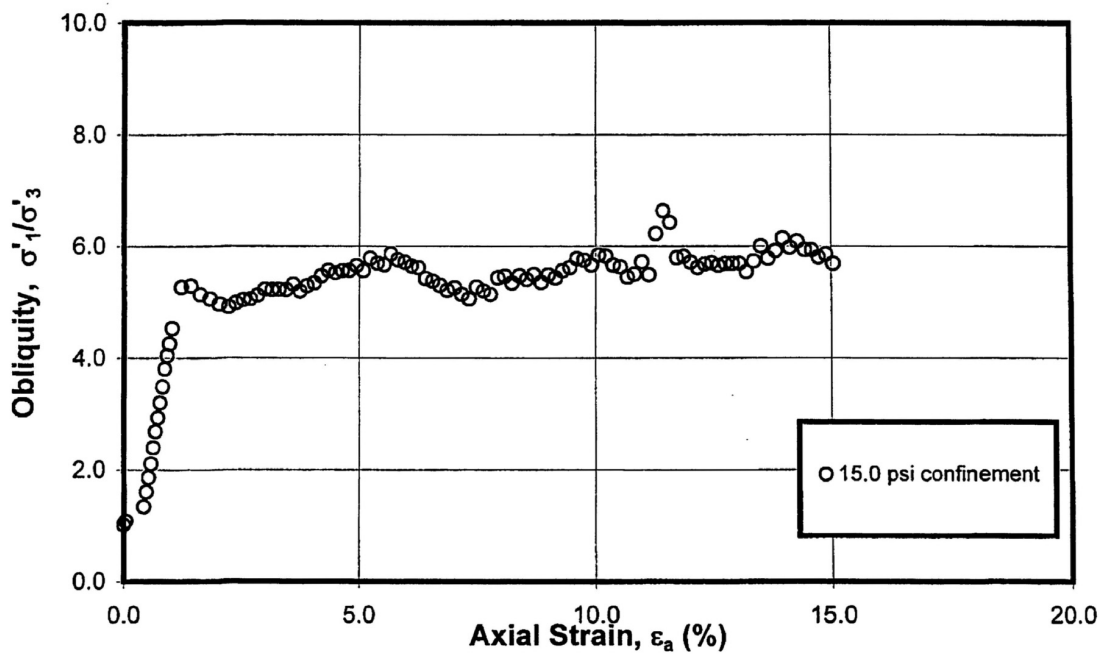
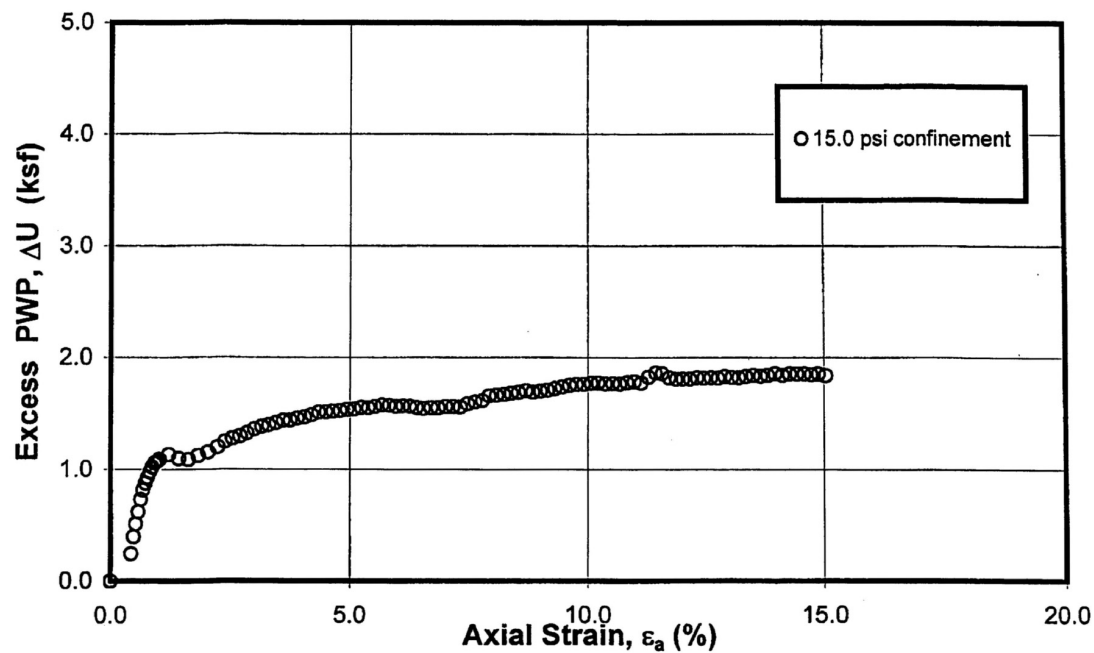
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD5c - Depth: 17.0-18.7 ft

Boring B-2321UD

Reviewed By: WEP



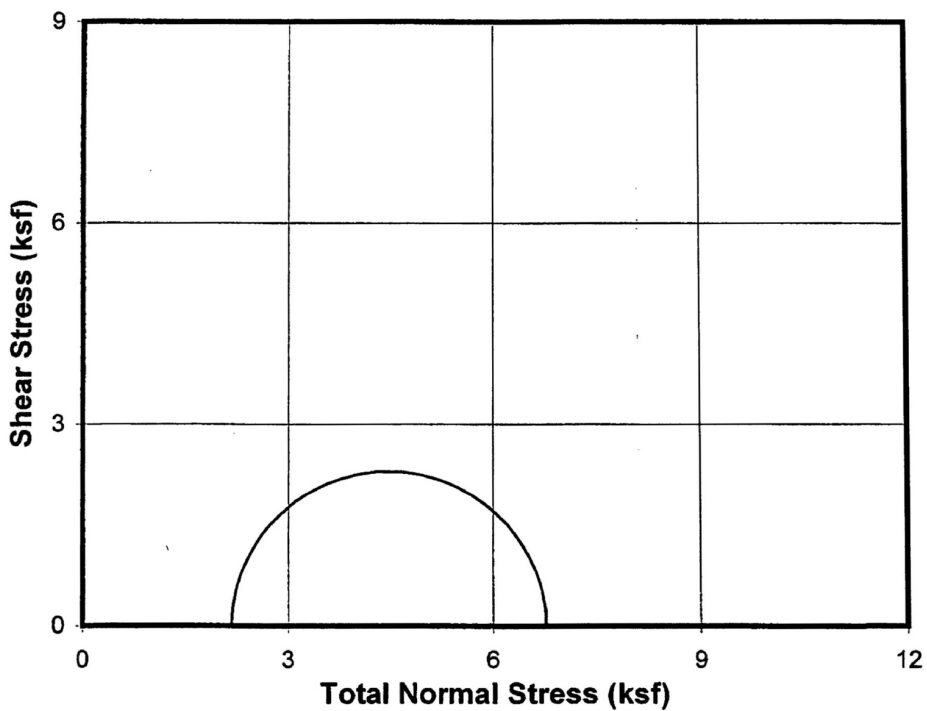
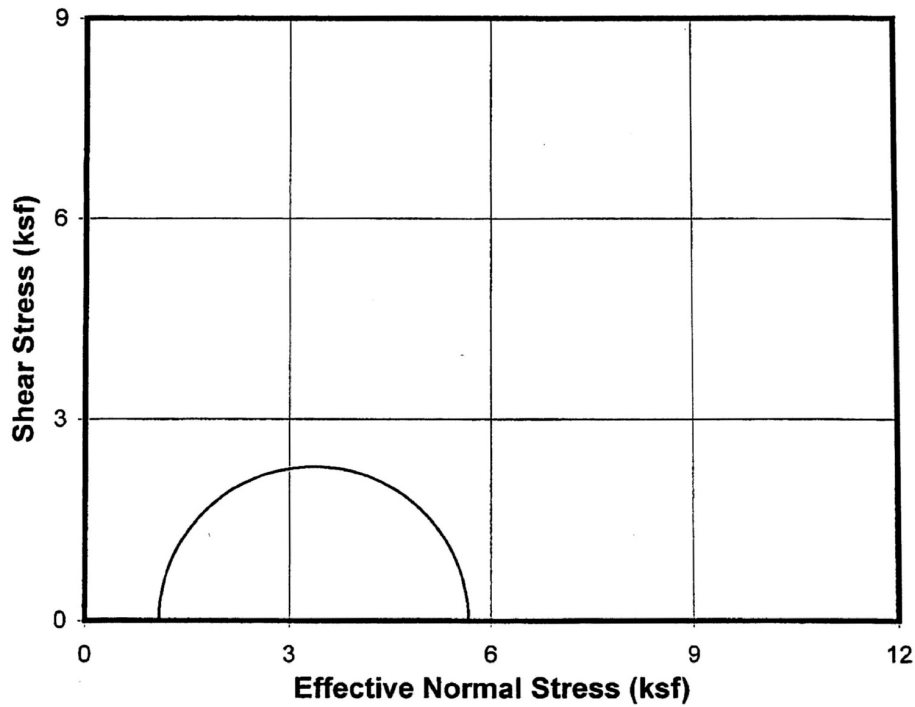
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD5c - Depth: 17.0-18.7 ft

Boring B-2321UD

Reviewed By: *WLD*



UNDRAINED TRIAXIAL COMPRESSION TEST
Isotropically Consolidated- Mohr's Circles
Sample: UD5c - Depth: 17.0-18.7 ft
Boring B-2321UD

Reviewed By: WLD

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-8 File Name: 2321UD_UD9
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 6.48 , NA , NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma'_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.680 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD9	Composite No.:	☐ Pluviated:		Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 58.5-61.0	Specimen No.: c	☐ Kneading		Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	☐ K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation	☐ Anisotropic	☐ 45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☐ Stress Path	☐ Stress
		☐ Constant Cell Pressure	☐ Cyclic (Hz)
		☐ Variable Cell Pressure	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	C4	4241	5065	622
Mass Moist Soil + Cont. (g)	87.51	89.59	88.96	122.06
Mass Dry Soil + Container (g)	78.37	79.72	79.26	107.17
Mass Container (g)	32.33	30.22	31.00	32.07
Water Content, $W_{o,n}$ (%)	19.85	19.94	20.10	19.83
Avg. Initial WC, $W_{o,avg}$ (%)	19.96	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		459.56	461.35
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		459.56	461.35
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)		Final (D_{at})	
GB 100.000	100.000	1 T	51.00	58.20	For
1 9.88	-5.94	2 M	51.00	58.00	Wedge
2 9.85	-6.16	3 B	51.00	57.50	Failure
3 9.87	-6.00	1 T		52.60	= d_{max}
4 9.81	-5.90	2 M		52.00	= d_{min}
5 9.91	-5.88	3 B			= Δd
Avg. 109.86	94.02	Avg. 51.00		55.66	xxxxx

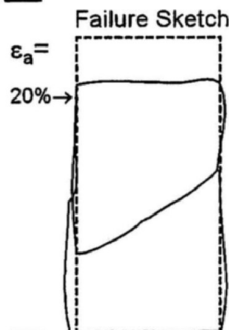
Measuring Devices:	$A_o = \pi D^2 / 400$ (cm ²)	20.43
Pi Tape: ☒ Dia	V_o (cm ³)	224.43
Calipers: ☐ Ht.; ☐ Dia	$A_{alb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	24.17
Dial Comparator: ☒ Ht.; ☐ Dia	$A_{stw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002	$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	55.47

☐ Photo Taken.

Failure Mode: NA - Not Applicable
 GB - Gage Block
 Other Remarks: LL=49 PL=14 PI=35

☒ Bulge
☐ Wedge
☐ Parabolic

Wedge/Bulge Ht. = NA (mm)



☐ See more detailed sketch on attached sheet. Remarks:

Estimated Initial Unit Weight			
Total, $\gamma_{t,o}$ (lb/ft ³) =	127.83	Dry, $\gamma_{d,o}$ (lb/ft ³) =	106.56
Membrane / Filter Paper / Apparatus			
Membrane (mm):	Top	Bottom	
Number:	Thickness:	0.72	0.61
= 1	Single; ☒ Double	0.73	0.60
Circumference ($C_{r,m,o}$)		148.0	148.0
Average:		Total Thickness	Dia. ($C_{r,m,o} / \pi$)
		0.33	47.11

Filter Paper: Top + Bottom:	☐ Yes ; ☒ No
Filter Strips:	☒ Yes ; ☐ No Number = 8
Type of Filter Strips	Vertical: 1/4 in. & Whatman #54
	☒ Spiral: 1/4 in. & Whatman #1

Apparatus:	Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) =	NA g, NA lbf

Top Cap Attached:	Piston Dia. (in.)	Load Cell:
☐ Yes; ☒ No;	☒ 1/2; ☐ 3/4;	☐ External ☒ Internal
Top Cap - Rotation	Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°	
With:	Frictionless End Caps;	Lat. Movement Top Cap
	Internal LVDT Jacket	

Final Visual Classification: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with Sand (CL)

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP
 Date: 3/4/2008 Date: 3/4/2008 Date: 4/7/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WIP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-8

File Name: 2321UD_UD9c

Task Number: NA

Specific Gravity: 2.680

☒ Measured; ☒ Assumed

Boring No.: B-2321UD

Sample No.: UD9

Specimen No.: c

Depth (ft): 58.5-61.0

Type Test: CIU Triaxial

 Specimen: ☒ "Undisturbed"; ☐ Reconstituted;

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

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)
W_o	19.85	19.94	20.10	19.96	19.96	19.36	19.96
S_o	94.0	94.3	94.7	94.3	94.3	92.8	Initial, $M_{d,o}$
							383.09
							Final, $M_{d,at}$
							385.01
							Selected, M_d
							385.01
Measured final mass of moist soil, $M_{t,at}$ (g)						461.35	
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						461.35	

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.06	-0.41		1.61	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	-0.41	-10.56	NA	8.09	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.39	-2.52		9.85	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				0.82	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.39	-2.52		8.09	NA	NA	NA

Summary For Test Stages					Number of Test Stages = 1 $t_{50} = 190$ min
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	135.28	NA	NA	NA	
Back Pressure, $U_{b,n}$ (psi)	90.19	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.50	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	6.52	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	4.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required G_s for $S_c = 100$ %:
$\Delta V_c = 5.18$	$\Delta V_c = 4.04$	$\Delta V_c = 9.16$	& corr. for ΔH_{td} $\Delta V_c =$	2.701

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 1.13	$\Delta V_{c,f}$ (cm^3) = 5.18	Back Cal. G_s for $S=100\%$ = 2.701	Normalized	Ht. Ch. (%) = 0.07
$\epsilon_{ac,c}$ (%) = 1.03	$\epsilon_{vc,f}$ (%) = 2.31		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:											
Initial:	109.86	224.43	20.43	19.36	127.83	107.09	92.7	0.560	0.3327	0.359	90.0
After to 1st σ'_c	108.73	219.25	20.16	19.83	131.36	109.62	101.5	0.524	0.3488	0.344	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

 Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

 (5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-8 File Name: 2321UD_UD9
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: <u>B-2321UD</u>	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lb) =	No. Layers =
Sample No.: <u>UD9</u>	Compostite No.: _____	☐ Pluviated: _____		Tamper Force (lb) =	Drop (in.) =
Depth (ft): <u>58.5-61.0</u>	Specimen No.: <u>c</u>	☐ Kneading		Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = <u>NA</u>
Remarks: _____					
Loading Conditions	☒ Static	☒ Undrained	☒ Comp. Ext.	☒ Strain Stress Path	☒ Constant Cell pressure
	☐ Post Cyclic	☐ Drained			☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ; <u>1</u> ; Other: _____

Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B parameter % (1)
					Total (pcf)	Dry (pcf)			
Condition: Initial:	109.86	224.43	20.43	19.36	127.83	107.09	92.74	0.56	90.0
After to 1st σ'_c	108.73	219.25	20.16	19.83	131.36	109.62	101.50	0.52	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	1.031	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	2.308	NA	NA	NA
Effective Vertical Stress, σ'_v :	(ksf)	6.516	NA	NA	NA
Effective Horizontal Stress, σ'_h :	(ksf)	6.470	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.993			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	12.985			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	6.485			
Undr. Ambient Shear Stress, τ_{ua} :	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type:	<u>Bulge</u>	
Modulus:	<u>150.0</u> psi	
Diameter:	<u>47.11</u> mm	
Thickness:	<u>0.33</u> mm	
Area Correction		
Type:	<u>Bulge</u>	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.138	24.17
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	<u>None</u>	
Type Strips:	<u>Spiral #1</u>	
Strips:	<u>8</u>	
Force:	<u>0.000</u> lbf/strip	

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

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ'_1 (ksf)	σ'_3 (ksf)
1st	Max Shear Stress	5.71	3.126	7.757	1.848	10.883	4.632
	Max Obliquity	3.78	2.999	7.240	2.227	10.239	4.241
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Strain Rate (%/min) = 2.11E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2321UD
Sample No.: UD9
Specimen No.: c

Depth (ft.): 58.5-61.0
Stage No.: 1

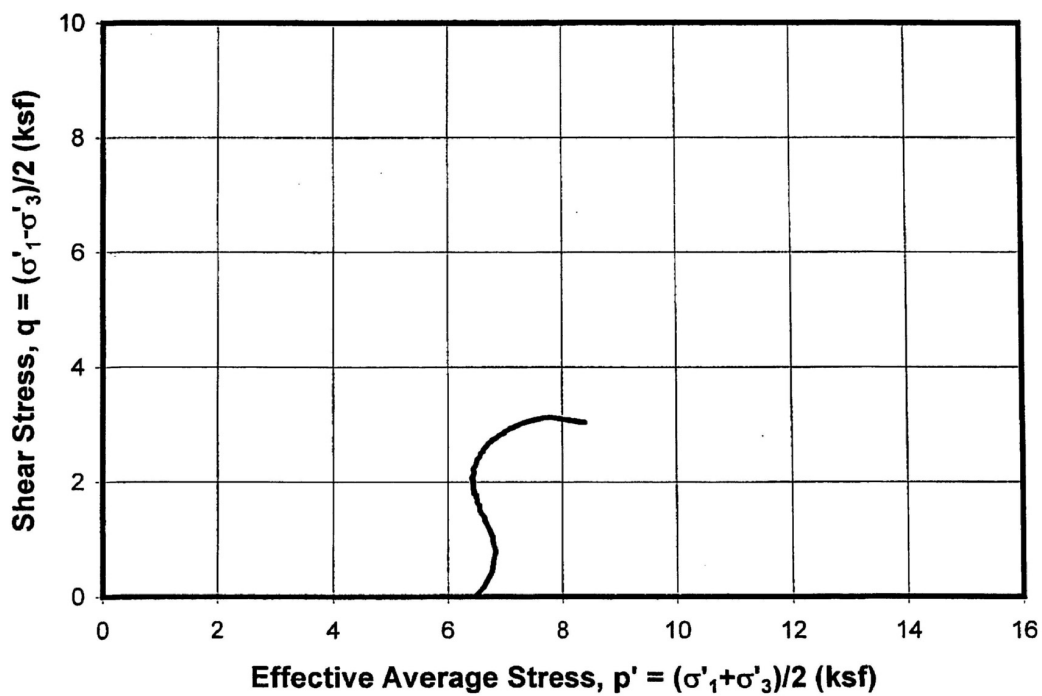
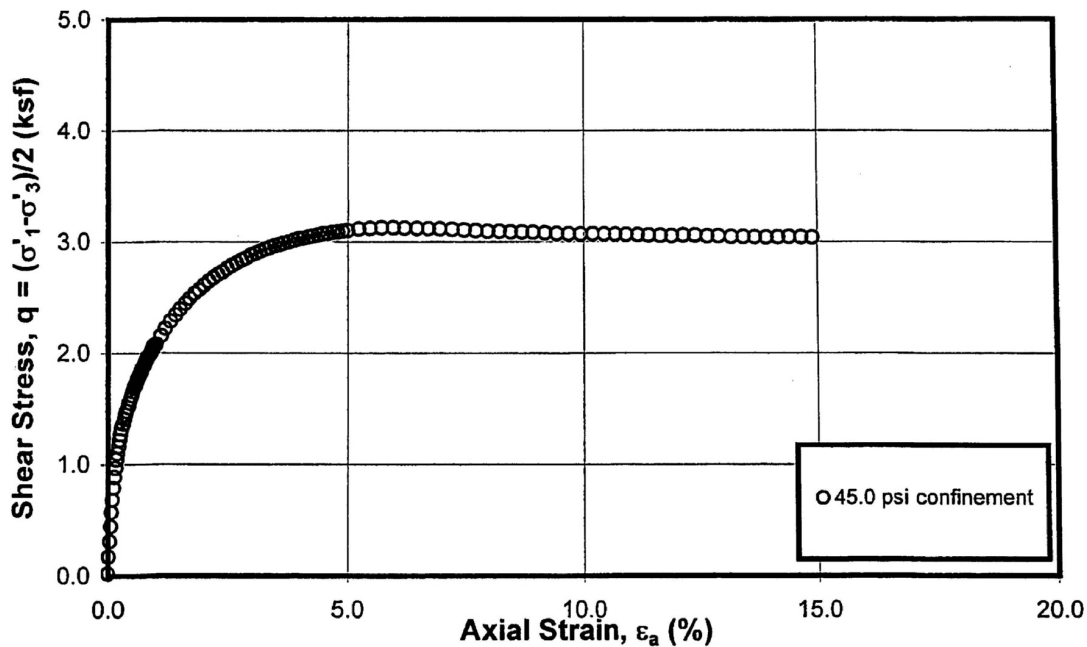
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.023	6.493	0.000	0.000	1.007	0.000	-	-
10.7	0.017	0.176	6.627	0.018	0.000	1.054	0.059	1837.8	1515.4
21.5	0.039	0.311	6.702	0.082	0.000	1.097	0.136	1466.1	1312.6
32.2	0.058	0.446	6.776	0.154	0.000	1.141	0.165	1455.1	1492.3
42.9	0.075	0.574	6.792	0.259	0.000	1.185	0.229	1476.7	1323.0
53.6	0.095	0.686	6.810	0.356	0.000	1.224	0.260	1394.4	973.5
64.3	0.120	0.791	6.837	0.428	0.000	1.262	0.276	1283.4	913.9
75.0	0.140	0.889	6.802	0.562	0.000	1.301	0.321	1238.9	901.6
85.8	0.159	0.969	6.786	0.660	0.000	1.333	0.345	1188.9	757.3
96.5	0.181	1.043	6.786	0.731	0.000	1.363	0.356	1129.2	595.1
107.2	0.204	1.101	6.752	0.830	0.000	1.390	0.380	1058.6	532.9
117.9	0.226	1.163	6.731	0.912	0.000	1.418	0.396	1010.1	526.3
128.6	0.250	1.222	6.700	0.992	0.000	1.446	0.413	959.8	530.8
139.3	0.268	1.274	6.675	1.069	0.000	1.472	0.427	933.3	552.1
150.0	0.287	1.325	6.642	1.151	0.000	1.498	0.443	906.8	390.2
160.8	0.320	1.365	6.645	1.197	0.000	1.517	0.443	839.3	272.1
171.5	0.349	1.409	6.621	1.272	0.000	1.541	0.454	793.8	343.3
182.2	0.370	1.449	6.589	1.332	0.000	1.564	0.466	771.3	383.2
192.9	0.387	1.482	6.574	1.378	0.000	1.582	0.472	753.5	287.7
203.6	0.422	1.516	6.547	1.443	0.000	1.603	0.482	708.0	274.6
214.3	0.443	1.554	6.556	1.475	0.000	1.621	0.479	690.7	326.4
225.1	0.467	1.590	6.551	1.522	0.000	1.641	0.481	670.7	279.8
235.8	0.493	1.623	6.521	1.578	0.000	1.663	0.491	649.2	257.7
246.5	0.518	1.655	6.506	1.624	0.000	1.682	0.496	630.4	246.6
257.2	0.544	1.686	6.512	1.651	0.000	1.699	0.494	611.6	229.6
267.9	0.568	1.713	6.500	1.695	0.000	1.716	0.498	595.0	214.7
278.6	0.595	1.741	6.482	1.731	0.000	1.734	0.503	577.1	241.8
289.4	0.616	1.770	6.500	1.750	0.000	1.748	0.498	567.0	212.7
300.1	0.645	1.791	6.454	1.809	0.000	1.768	0.511	548.6	188.2
310.8	0.666	1.816	6.469	1.814	0.000	1.780	0.507	538.1	218.6
321.5	0.691	1.841	6.457	1.849	0.000	1.798	0.510	526.4	268.0
332.2	0.707	1.868	6.448	1.882	0.000	1.816	0.512	521.8	227.8
342.9	0.746	1.893	6.441	1.926	0.000	1.833	0.514	501.1	176.0
353.6	0.769	1.918	6.437	1.966	0.000	1.849	0.515	493.1	199.2
364.4	0.794	1.940	6.444	1.962	0.000	1.862	0.513	482.8	216.3
375.1	0.811	1.962	6.437	1.994	0.000	1.877	0.514	478.1	184.5
385.8	0.848	1.983	6.447	2.007	0.000	1.888	0.512	462.3	139.3
396.5	0.874	2.004	6.445	2.028	0.000	1.903	0.512	453.6	166.2

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
407.2	0.895	2.022	6.431	2.063	0.000	1.917	0.515	446.6	168.9
417.9	0.919	2.042	6.443	2.083	0.000	1.928	0.512	439.6	229.1
428.7	0.933	2.063	6.412	2.107	0.000	1.949	0.520	437.2	190.9
439.4	0.972	2.082	6.431	2.127	0.000	1.958	0.515	423.5	116.5
482.2	1.080	2.156	6.455	2.172	0.000	2.003	0.509	394.9	138.2
525.1	1.172	2.220	6.440	2.255	0.000	2.052	0.512	374.9	134.3
567.9	1.276	2.287	6.478	2.279	0.000	2.091	0.503	354.8	115.4
610.8	1.381	2.340	6.498	2.321	0.000	2.126	0.499	335.7	104.0
653.7	1.480	2.393	6.509	2.356	0.000	2.163	0.497	320.3	99.5
696.5	1.591	2.444	6.558	2.379	0.000	2.188	0.486	304.5	94.0
739.4	1.686	2.489	6.564	2.398	0.000	2.222	0.486	292.6	94.3
782.2	1.787	2.537	6.614	2.402	0.000	2.244	0.476	281.4	82.2
825.1	1.876	2.568	6.617	2.427	0.000	2.269	0.476	271.3	75.6
868.0	1.982	2.611	6.666	2.416	0.000	2.288	0.467	261.2	77.4
910.8	2.083	2.648	6.693	2.429	0.000	2.310	0.462	252.1	65.4
953.7	2.177	2.675	6.711	2.438	0.000	2.326	0.459	243.6	62.5
996.5	2.274	2.708	6.760	2.426	0.000	2.337	0.450	236.2	56.6
1039.4	2.371	2.730	6.777	2.433	0.000	2.349	0.447	228.3	57.1
1082.3	2.467	2.763	6.838	2.407	0.000	2.356	0.437	222.2	57.9
1125.1	2.567	2.786	6.866	2.392	0.000	2.366	0.432	215.3	47.1
1168.0	2.668	2.810	6.894	2.391	0.000	2.377	0.428	209.0	47.9
1210.8	2.773	2.836	6.937	2.389	0.000	2.383	0.421	202.9	41.8
1253.7	2.875	2.854	6.980	2.359	0.000	2.383	0.414	196.9	44.9
1296.5	2.972	2.880	7.000	2.361	0.000	2.398	0.411	192.3	41.6
1339.4	3.072	2.895	7.031	2.339	0.000	2.400	0.406	187.0	32.5
1382.3	3.170	2.912	7.058	2.336	0.000	2.405	0.402	182.3	38.8
1425.1	3.273	2.934	7.090	2.313	0.000	2.412	0.397	177.9	34.0
1468.0	3.372	2.947	7.124	2.297	0.000	2.411	0.392	173.4	30.7
1510.8	3.472	2.964	7.167	2.267	0.000	2.411	0.385	169.4	26.0
1553.7	3.574	2.973	7.178	2.275	0.000	2.414	0.384	165.1	23.2
1596.6	3.668	2.987	7.215	2.235	0.000	2.413	0.378	161.6	26.4
1639.4	3.776	2.999	7.240	2.227	0.000	2.415	0.374	157.6	23.3
1682.3	3.876	3.011	7.274	2.214	0.000	2.413	0.369	154.2	24.0
1725.1	3.979	3.024	7.301	2.194	0.000	2.414	0.365	150.8	18.2
1768.0	4.079	3.030	7.334	2.166	0.000	2.408	0.360	147.4	18.6
1810.8	4.183	3.043	7.352	2.156	0.000	2.412	0.358	144.4	21.6
1853.7	4.279	3.051	7.395	2.132	0.000	2.405	0.351	141.6	16.9
1896.6	4.381	3.060	7.429	2.096	0.000	2.400	0.346	138.6	17.9
1939.4	4.484	3.070	7.448	2.094	0.000	2.402	0.343	135.9	13.6
1982.3	4.585	3.073	7.477	2.074	0.000	2.396	0.339	133.1	14.6
2025.1	4.688	3.085	7.519	2.040	0.000	2.391	0.332	130.6	13.1
2068.0	4.791	3.087	7.531	2.041	0.000	2.389	0.331	127.9	8.8
2110.9	4.885	3.093	7.547	2.027	0.000	2.389	0.328	125.7	11.7

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
2153.7	4.990	3.099	7.596	1.969	0.000	2.378	0.321	123.3	10.7
2260.9	5.230	3.112	7.656	1.931	0.000	2.370	0.312	118.1	8.4
2368.0	5.471	3.119	7.708	1.881	0.000	2.359	0.304	113.2	5.6
2475.2	5.711	3.126	7.757	1.848	0.000	2.350	0.296	108.7	2.0
2582.3	5.961	3.123	7.776	1.822	0.000	2.343	0.293	104.0	-1.4
2689.4	6.198	3.122	7.823	1.767	0.000	2.328	0.285	100.0	-1.9
2796.6	6.460	3.119	7.863	1.727	0.000	2.315	0.279	95.8	-2.5
2903.7	6.716	3.116	7.902	1.692	0.000	2.302	0.272	92.1	-2.2
3010.9	6.963	3.113	7.912	1.667	0.000	2.297	0.270	88.8	-2.4
3118.0	7.222	3.109	7.968	1.619	0.000	2.280	0.261	85.5	-3.4
3225.2	7.469	3.105	7.987	1.595	0.000	2.272	0.258	82.5	-4.7
3332.3	7.714	3.098	8.008	1.563	0.000	2.262	0.254	79.7	-4.7
3439.5	7.957	3.093	8.033	1.540	0.000	2.252	0.249	77.2	-2.3
3546.6	8.203	3.092	8.071	1.499	0.000	2.242	0.243	74.8	-2.8
3653.7	8.445	3.086	8.096	1.462	0.000	2.232	0.238	72.6	-1.4
3760.9	8.686	3.089	8.125	1.437	0.000	2.227	0.234	70.6	-1.0
3868.0	8.924	3.084	8.100	1.449	0.000	2.230	0.237	68.6	-4.3
3975.2	9.175	3.078	8.111	1.427	0.000	2.223	0.235	66.6	-3.8
4082.3	9.432	3.075	8.144	1.394	0.000	2.213	0.229	64.7	-3.6
4189.5	9.681	3.069	8.167	1.380	0.000	2.204	0.225	62.9	-2.6
4296.6	9.935	3.068	8.158	1.382	0.000	2.205	0.226	61.3	0.9
4403.8	10.195	3.071	8.196	1.351	0.000	2.199	0.221	59.8	0.1
4510.9	10.457	3.068	8.236	1.323	0.000	2.187	0.214	58.2	-2.6
4618.1	10.706	3.065	8.216	1.313	0.000	2.190	0.217	56.8	-2.4
4725.2	10.946	3.062	8.236	1.304	0.000	2.184	0.213	55.5	-2.5
4832.3	11.199	3.059	8.254	1.289	0.000	2.177	0.210	54.2	-2.7
4939.5	11.431	3.056	8.243	1.288	0.000	2.178	0.211	53.1	-2.2
5046.6	11.684	3.053	8.266	1.278	0.000	2.171	0.207	51.9	-1.8
5153.8	11.924	3.052	8.288	1.258	0.000	2.165	0.204	50.8	0.8
5260.9	12.169	3.055	8.308	1.223	0.000	2.163	0.201	49.8	1.4
5368.1	12.419	3.055	8.312	1.217	0.000	2.162	0.200	48.8	-2.5
5475.2	12.674	3.049	8.304	1.222	0.000	2.160	0.201	47.7	-2.4
5582.4	12.911	3.049	8.296	1.226	0.000	2.162	0.202	46.9	-3.0
5689.5	13.183	3.041	8.299	1.215	0.000	2.157	0.201	45.8	-2.3
5796.6	13.440	3.042	8.343	1.174	0.000	2.148	0.194	44.9	-0.8
5903.8	13.687	3.039	8.362	1.155	0.000	2.142	0.190	44.1	-2.4
6010.9	13.932	3.036	8.386	1.129	0.000	2.135	0.186	43.3	0.1
6118.1	14.177	3.039	8.401	1.109	0.000	2.133	0.184	42.5	1.7
6225.2	14.412	3.040	8.391	1.123	0.000	2.136	0.185	41.9	-0.4
6332.4	14.671	3.038	8.407	1.110	0.000	2.132	0.183	41.1	-1.3
6431.9	14.900	3.037	8.414	1.116	0.000	2.130	0.181	40.5	-0.3



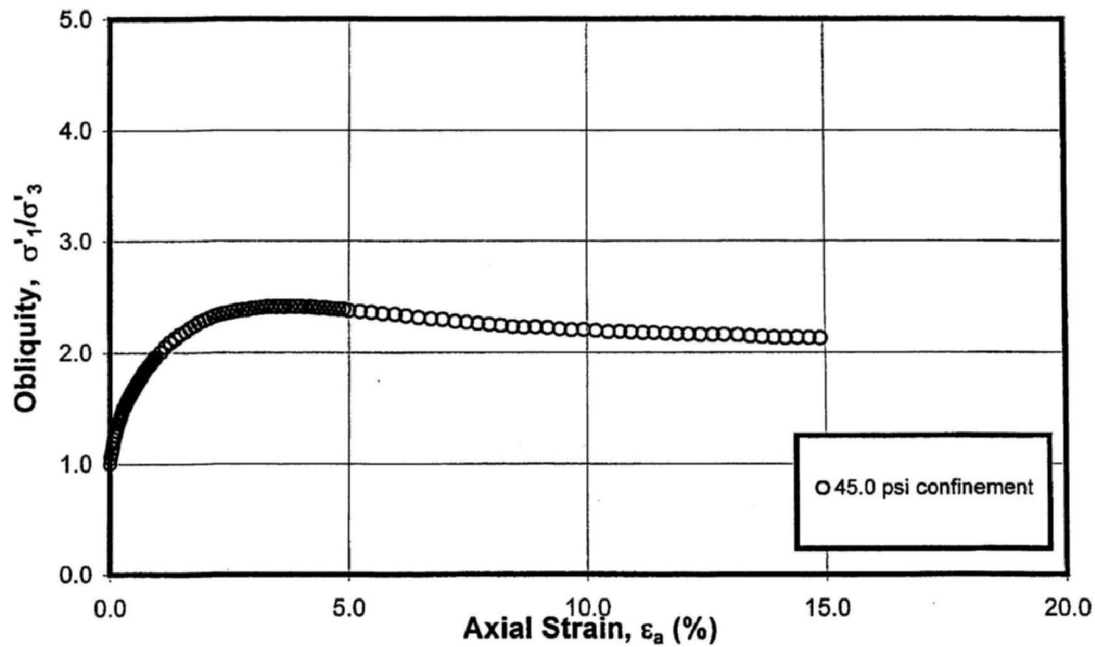
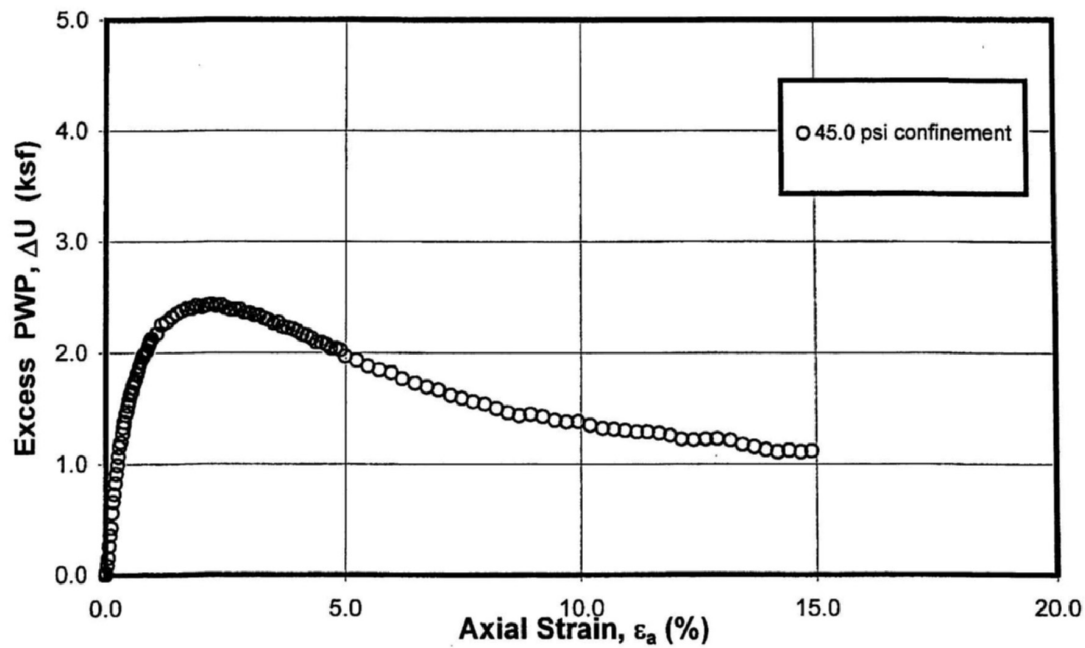
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD9c - Depth: 58.5-61.0 ft

Boring B-2321UD

Reviewed By: *WIP*



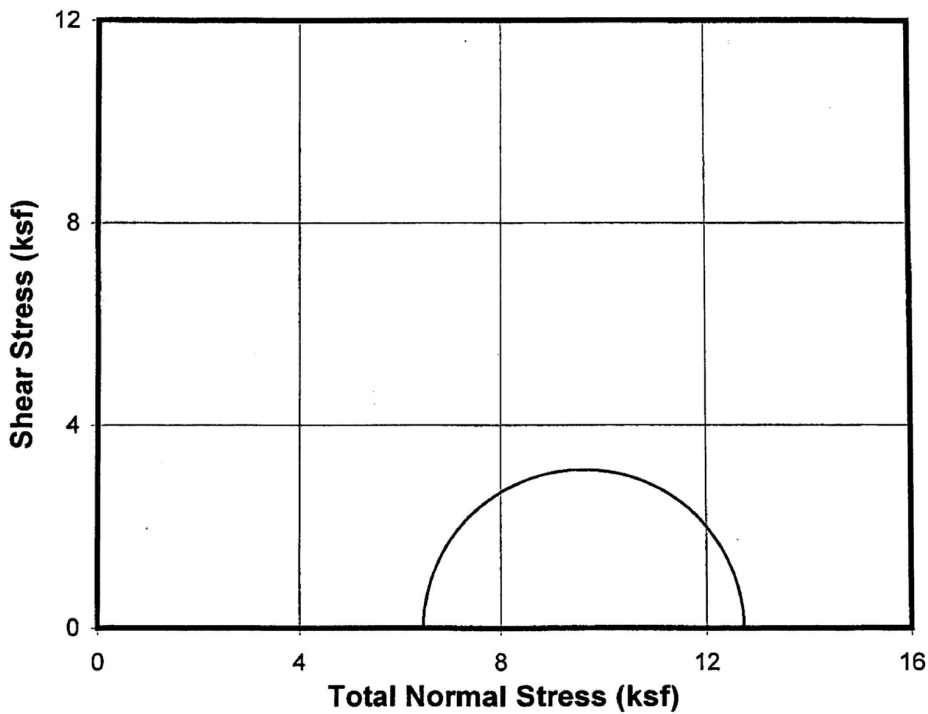
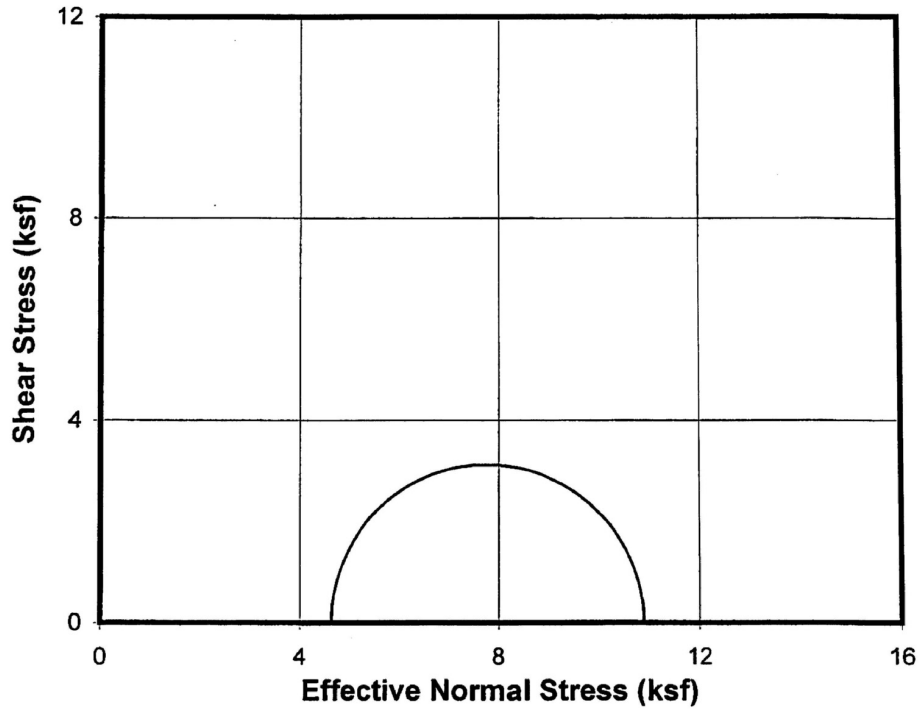
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD9c - Depth: 58.5-61.0 ft

Boring B-2321UD

Reviewed By: *WLD*



UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated- Mohr's Circles

Sample: UD9c - Depth: 58.5-61.0 ft

Boring B-2321UD

Reviewed By: *WFD*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-7 File Name: 2321UD_UD1
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 11.52, NA, NA & NA ksf
 Project Name: Exelon (Victoria) $k (\sigma'_{h,c} / \sigma'_{v,c}) = 1.00$ Induced OCR = 1.00 $K_{ua} (\sigma'_{d,ua} / 2\sigma'_{v,c}) = NA$

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD15	Compostite No.:	☐ Pluviated:		Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 130.5-132.5	Specimen No.: c	☐ Kneading		Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☒ Strain	☐ Stress
		☐ Stress Path	☒ Constant Cell Pressure
			☐ Variable Cell Pressure
			Cyclic (Hz) Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	137	581	5001	609
Mass Moist Soil + Cont. (g)	62.28	62.96	82.50	116.21
Mass Dry Soil + Container (g)	56.89	57.40	74.14	101.00
Mass Container (g)	30.03	31.64	30.72	31.63
Water Content, $W_{o,n}$ (%)	20.07	21.58	19.25	21.93
Avg. Initial WC, $W_{o,avg}$ (%)	20.30	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		483.35	489.84
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_h (g)		483.35	489.84
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)		Final (D_{at})	
GB 100.000	100.000	1 T	51.00	57.70	For
1 15.27	-0.89	2 M	50.90	57.80	Wedge
2 15.24	-1.55	3 B	50.90	58.90	Failure
3 15.24	-2.14	1 T		54.40	= d_{max}
4 15.30	-2.85	2 M		51.70	= d_{min}
5 15.27	-1.30	3 B			= Δd
Avg. 115.26	98.25	Avg.	50.93	56.10	xxxxx

Measuring Devices:	$A_o = \pi D^2 / 400 \text{ (cm}^2\text{)}$	20.37
Pi Tape: ☒ Dia	$V_o \text{ (cm}^3\text{)}$	234.85
Calipers: ☐ Ht.; ☐ Dia	$A_{atb,m} = \pi (D'_{at})^2 / 400 \text{ (cm}^2\text{)}$	24.38
Dial Comparator: ☒ Ht.; ☐ Dia	$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400 \text{ (cm}^2\text{)}$	NA
Remarks: ID# PI-002	$D'_{at} = (D_T + 2D_M + D_B) / 4 \text{ (mm)}$	55.71

Photo Taken. ☐

Failure Sketch

$\epsilon_a = 20\%$

Failure Mode: NA - Not Applicable

☐ Bulge

☒ Wedge

☐ Parabolic

Wedge/Bulge Ht. =

NA (mm)

Final Visual Classification: Pale Yellow Fat CLAY with Sand (CH)

Estimated Initial Unit Weight			
Total, $\gamma_{t,o}$ (lb/ft ³) =	128.49	Dry, $\gamma_{d,o}$ (lb/ft ³) =	106.80
Membrane / Filter Paper / Apparatus			
Membrane (mm):	Top	Bottom	
Number:	Thickness:	0.57	0.69
= 1	Single; ☒ Double	0.58	0.69
Circumference ($C_{r,m,o}$)		150.0	150.0
Average:		Total Thickness	Dia. ($C_{r,m,o} / \pi$)
		0.32	47.75
Filter Paper: Top + Bottom:	☐ Yes; ☒ No		
Filter Strips:	☒ Yes; ☐ No	Number = 8	
Type of Filter Strips	☐ Vertical: 1/4 in. & Whatman #54		
	☒ Spiral: 1/4 in. & Whatman #1		
Apparatus:	Mass Top Cap, M_{tc} =	53.4 g, 0.12 lbf	
	Mass Displ. System, M_{ds} (cap, dial, piston, etc.) =	NA g, NA lbf	
Top Cap Attached:	Piston Dia. (in.)	Load Cell:	
☐ Yes; ☒ No; ☒ 1/2; ☐ 3/4		☐ External; ☒ Internal	
Top Cap - Rotation	Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°		
With:	Frictionless End Caps; ☐	Lat. Movement Top Cap	
	Internal LVDT Jacket ☐		

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: AW
 Date: 3/24/2008 Date: 3/24/2008 Date: 4/14/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WER

☐ See more detailed sketch on attached sheet.

Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-7

File Name: 2321UD_UD15c

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☒ Assumed

Boring No.: B-2321UD

Sample No.: UD15

Specimen No.: c

Depth (ft): 130.5-132.5

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐

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

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	20.30
W_o 20.07	21.58	19.25	20.30	20.30	20.31	Initial, $M_{d,o}$	401.79
S_o 94.1	97.8	92.0	94.7	94.7	94.7	Final, $M_{d,at}$	401.75
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	401.79
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.02	-0.12		0.80	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	0.31	-8.22	NA	25.72	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.09	-0.72		4.89	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				5.26	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.09	-8.22		8.72	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	129.87	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 160$ min
Back Pressure, $U_{b,n}$ (psi)	49.72	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.51	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	11.49	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	14.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures					
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required	
$\Delta V_c =$ 0.41	$\Delta V_c =$ -1.89	$\Delta V_c =$ 1.72	& corr. for ΔH_{id} $\Delta V_c =$	G_s for $S_c = 100$ %:	2.753

At Final Test Stress/Stage - Consolidation Conclusions					
$\Delta H_{c,f}$ (mm) = 0.67	$\Delta V_{c,f}$ (cm^3) = 0.41	Back Cal. G_s for $S=100\%$ = 2.753	Normalized	Ht. Ch. (%) = -0.06	
$\epsilon_{ac,c}$ (%) = 0.58	$\epsilon_{vc,f}$ (%) = 0.17		Diff. in:	Vol. Ch. (%) =	

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:											
Initial:	115.26	234.85	20.37	20.30	128.49	106.80	94.6	0.581	0.3479	0.368	95.0
After to 1st σ'_c	114.60	234.44	20.46	21.91	130.44	106.99	102.7	0.579	0.3762	0.366	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-7 File Name: 2321UD_UD1
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: <u>B-2321UD</u>		☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt.(lbf) =	
Sample No.: <u>UD15</u>		Compostite No.: _____	☐ Pluviated:	Tamp Force (lbf) =	
Depth (ft): <u>130.5-132.5</u>		Specimen No.: <u>c</u>	☐ Kneading	Undercompaction: U_{nl} (%) =	
☐ Spec. Selection by X-ray;		☐ Geomarine Sample		Ref. Effort = % Comp. = $\pm$ Opt. =	

Type	☒ Isotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = <u>NA</u>	
Consolidation	☐ Anisotropic	☐ 45° stress path	Remarks:		
Loading Conditions	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☐ Stress
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Constant Cell pressure
					☐ Cyclic (Hz)
					Rate: <u>0.1</u> ; <u>1</u> ; Other:

Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	Void Ratio e	Skempton B para- meter % (1)
Condition: Initial:	115.26	234.85	20.37	20.30	128.49	106.80	94.64	0.58	95.0
After to 1st σ'_c	114.60	234.44	20.46	21.91	130.44	106.99	102.66	0.58	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	0.579	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	0.175	NA	NA	NA
Effective Vertical Stress, σ'_v :	(ksf)	11.492	NA	NA	NA
Effective Horizontal Stress, σ'_h :	(ksf)	11.438	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.995			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	22.930			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	11.456			
Undr. Ambient Shear Stress, τ_{a0} :	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type:	<u>Bulge</u>	
Modulus:	<u>150.0</u> psi	
Diameter:	<u>47.75</u> mm	
Thickness:	<u>0.32</u> mm	
Area Correction		
Type:	<u>Bulge</u>	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.157	24.38
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	<u>None</u>	
Type Strips:	<u>Spiral #1</u>	
Strips:	<u>8</u>	
Force:	<u>0.000</u> lbf/strip	

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

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Pale Yellow Fat CLAY with Sand (CH)

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	2.21	3.352	4.728	10.053	8.079	1.376
	Max Obliquity	2.21	3.352	4.728	10.053	8.079	1.376
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Strain Rate (%/min) = 2.50E-03