

**FINAL DATA REPORT Rev. 2  
GEOTECHNICAL EXPLORATION AND TESTING**

**TURKEY POINT COL PROJECT  
FLORIDA CITY, FLORIDA**

**October 6, 2008**

**VOLUME 1  
Appendix A – Survey Report**

**Prepared By:**

**MACTEC Engineering and Consulting, Inc.  
Raleigh, North Carolina**

**MACTEC Project No. 6468-07-1950**

**Prepared For:**

**Bechtel Power Corporation  
Subcontract No. 25409-102-HC4-CY00-00001**

**MACTEC ENGINEERING AND CONSULTING, INC.**

**SURVEYOR'S REPORT  
OF**

**AS-BUILT SURVEY OF GEOTECHNICAL INVESTIGATION SITES  
AT TURKEY POINT NUCLEAR PLANT, PROPOSED UNITS 6 AND 7  
MIAMI-DADE COUNTY, FL**

**MACTEC Project number 6468-07-1950**

As part of the project assignment MACTEC was responsible for the as-built locations of all geotechnical investigation sites at the Turkey Point Nuclear Plant, proposed Units 6&7, known as the Island Site. The geotechnical investigation sites consisted of soil boring sites, ground water observation sites, cone penetration test sites and test pits staked and drilled by MACTEC. This surveyor's report lists the geographical locations and elevations of the geotechnical investigation sites and provides information as to horizontal and vertical datum's, survey control points, and procedures and equipment utilized in the course of the survey.

**Horizontal and Vertical Datums**

The horizontal locations of all geotechnical investigation sites are relative to the North American Datum of 1983/ 1990 adjustment (NAD83/90) with the values expressed in Florida State Plane Coordinates (FSPC), Florida East, Zone 901, expressed in US feet.

The elevations of all of the geotechnical investigation sites are relative to the North American Vertical Datum of 1988 (NAVD88) expressed in US feet.

**Primary Control from which As-built Survey is based**

To support the needs of this assignment as well as establish survey control for future work at the Island Site, two (2) primary control stations were established in the course of this survey. The control stations, known as CRC1 and CRC2 are located immediately west of the Island Site on the west side of the perimeter canal and roadway. The control stations are poured-in-place concrete monuments with brass discs stamped "CRC1 2007" and "CRC2 2007" respectively.

Geographical positions for the primary control stations were established utilizing Global Positioning System (GPS) static measurement procedures. GPS observations were conducted using three Trimble Navigation, Ltd. dual-frequency receivers

(one model 5800 and two model 5700) on January 17-19, 2008. Observations were made to primary control stations CRC1 and CRC2 as well as to National Geodetic Survey (NGS) geodetic control stations "FIRE", "QUARRY\_2" and "TURKEY POINT RM3" (go to [www.ngs.noaa.gov](http://www.ngs.noaa.gov) for additional information regarding the NGS control stations). Measured vectors were processed daily and loop closures were performed for evaluation of data. After loop closures were performed, a free adjustment was made. A single point was held fixed in X, Y and Z coordinate values. Misclosures were calculated for each of the other control points and outliers flagged for further evaluation. Any suspect values were remeasured to ensure that any abnormalities were not caused by poor baseline data. Each point in the network was occupied multiple times during different satellite constellations. Vectors used in the final constrained adjustment are independent, non-trivial vectors. Network adjustments were conducted using GeoLab 2001.90.20.20.0 .

Elevations for the primary control stations were established by differential leveling from NGS benchmarks "Y 314", "A 316" and "LM 18 316 FPLCO" ( go to [www.ngs.noaa.gov](http://www.ngs.noaa.gov) for additional information regarding NGS benchmarks). A Zeiss DiNi21 Digital level with matching level rods was utilized for this assignment. The instrument was calibrated using the Kukkamaki Method prior to initiating the level runs. All level runs originated and closed on NGS benchmarks and utilized 3<sup>rd</sup> order leveling procedures. The data collected in the course of the level runs was reduced and adjusted utilizing STAR\*LEV Adjustment software, Version 1.30 . Results yielded 3<sup>rd</sup> order accuracies.

The listing below provides geographic positions and elevations for the primary control stations utilized in the course of performing the As-built survey.

| Primary Station | FSPC Feet (NAD83/90) |           | Elevation Feet ( NAVD88) |
|-----------------|----------------------|-----------|--------------------------|
|                 | Northing             | Easting   |                          |
| CRC1            | 398398.35            | 874595.10 | 4.58                     |
| CRC2            | 397319.37            | 874826.93 | 3.68                     |

### Performing the As-built Survey

The As-built survey of the geotechnical investigation sites was made utilizing GPS technology operating in Real Time Kinematic (RTK) mode. Utilizing the above referenced primary control stations, a Trimble Navigation Ltd. Model 5700 GPS-RTK dual-frequency receiver system was used to collect the survey data. A base station with fixed height tripod was set on primary control station CRC2 as the basis for measurements. The rover unit, with fixed height bipod, was used to acquire the data by visiting each geotechnical investigation site. Before and after each measurement session a "check" measurement was made by the rover unit at primary control station CRC1 to verify the values being obtained in the measurement process.

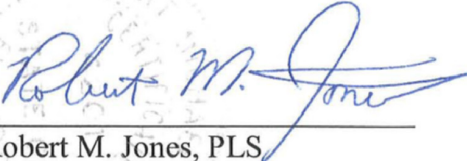
A measurement was made at each geotechnical investigation site on two separate occasions as a quality control procedure. Acceptable measurements were averaged to develop final coordinate and elevation values.

Listed on Attachment A are the Florida State Plane Coordinates (North American Datum of 1983/Adjustment of 1990, Florida East, Zone 0901, US feet) and elevations ( North American Vertical Datum 1988, US feet) for each geotechnical investigation site. The coordinates and elevations for the borings, cone penetration and test pits were measured at the center of the hole or pit. The coordinates and elevations for each observation well were measured at both the northeast corner of the concrete pad surrounding the well site as well as the top of the PVC pipe (north side of pipe with notch or mark) located inside the well casing. This survey is certified as meeting the project specification to locate the borings and other geotechnical exploration points to the nearest 0.5' horizontally and the vertical accuracy to the nearest 0.1'.

#### Surveyors Notes

- 1) Copies of this Surveyor's Report are not valid with out the signature and original embossed seal of the Florida Registered Land Surveyor in responsible charge.
- 2) Last date in field: June 24, 2008
- 3) Field Book : 978

For the Firm,  
**MACTEC Engineering and Consulting, Inc.**



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## **Summary of Locations and Elevations of Geotechnical Investigation Sites**

surveys made between April 21, 2008 and June 24, 2008

| State Plane Coordinates, North American Datum of 1983/ Adjustment of 1990, Florida East, Zone 0901, US Feet |          |          |          |           |
|-------------------------------------------------------------------------------------------------------------|----------|----------|----------|-----------|
| Elevations ( North American Vertical Datum of 1988, US Feet)                                                |          |          |          |           |
| Name                                                                                                        | Comments | Northing | Easting  | Elevation |
| <b>Borings</b>                                                                                              |          |          |          |           |
| B - 601 (DH)                                                                                                |          | 396967.9 | 876642.9 | -1.4      |
| B - 602                                                                                                     |          | 397019.6 | 876594.1 | -1.4      |
| B - 603                                                                                                     |          | 397018.4 | 876697.0 | -1.4      |
| B - 604 (DH)                                                                                                |          | 396915.9 | 876591.6 | -1.5      |
| B - 605                                                                                                     |          | 396916.8 | 876694.1 | -1.7      |
| B - 606                                                                                                     |          | 396958.9 | 876738.0 | -1.4      |
| B - 607                                                                                                     |          | 396830.0 | 876644.2 | -1.5      |
| B - 608 (DH)                                                                                                |          | 396829.5 | 876735.9 | -1.5      |
| B - 609                                                                                                     |          | 396762.5 | 876689.0 | -1.5      |
| B - 610 (DH)                                                                                                |          | 397084.2 | 876644.4 | -1.4      |
| B - 611                                                                                                     |          | 397086.7 | 876735.0 | -1.5      |
| B - 612                                                                                                     |          | 397085.5 | 876869.1 | -1.5      |
| B - 613                                                                                                     |          | 397162.2 | 876809.4 | -1.4      |
| B - 614                                                                                                     |          | 397204.1 | 876870.7 | -1.5      |
| B - 615                                                                                                     |          | 397167.4 | 876761.8 | -1.5      |
| B - 616                                                                                                     |          | 397207.9 | 876723.7 | -1.2      |
| B - 617                                                                                                     |          | 397288.1 | 876721.7 | -1.4      |
| B - 618                                                                                                     |          | 397207.6 | 876643.1 | -1.4      |
| B - 619                                                                                                     |          | 397293.9 | 876653.7 | -1.7      |
| B - 620 (DH)                                                                                                |          | 397394.9 | 876648.3 | -1.5      |
| B - 621                                                                                                     |          | 397367.6 | 876949.3 | 0.2       |
| B - 622                                                                                                     |          | 397421.2 | 876810.7 | 0.2       |
| B - 623                                                                                                     |          | 397422.6 | 876523.2 | -1.3      |
| B - 624                                                                                                     |          | 397327.1 | 876514.1 | -1.4      |
| B - 625                                                                                                     |          | 397106.5 | 876960.5 | -1.4      |
| B - 626                                                                                                     |          | 396874.5 | 876857.2 | -1.6      |
| B - 627                                                                                                     |          | 396835.2 | 876332.9 | -1.3      |
| B - 628                                                                                                     |          | 397072.9 | 876473.2 | -1.5      |
| B - 629                                                                                                     |          | 396971.9 | 876346.1 | -1.1      |
| B - 630                                                                                                     |          | 396871.5 | 876462.1 | -1.5      |

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|                |                                |           |           |      |
|----------------|--------------------------------|-----------|-----------|------|
| B - 631        |                                | 396655.1  | 876514.1  | -1.2 |
| B - 632        |                                | 396432.4  | 876737.0  | -1.6 |
| B - 633        |                                | 396113.3  | 876993.9  | -1.5 |
| B - 634        |                                | 395758.2  | 876677.2  | -0.7 |
| B - 635        |                                | 395770.9  | 876798.2  | -0.9 |
| B - 636        |                                | 395714.8  | 877193.2  | -1.1 |
| B - 637        |                                | 395693.1  | 877310.3  | -0.2 |
| B - 639        |                                | 396963.5  | 876998.2  | -1.4 |
| B - 640 (DHT)  | <b>also known as C - 602 A</b> | 397116.6  | 876528.3  | -0.3 |
| B - 701 (DH)   |                                | 396976.1  | 875792.3  | -1.1 |
| B - 702        |                                | 397017.9  | 875745.9  | -1.2 |
| B - 703        |                                | 397018.1  | 875846.1  | -1.3 |
| B - 704 (DH)   |                                | 396930.7  | 875741.7  | -1.4 |
| B - 704 G (DH) |                                | 396938.6  | 875749.0  | -1.3 |
| B - 705        |                                | 396919.2  | 875846.4  | -1.3 |
| B - 706        |                                | 396962.5  | 875885.3  | -1.2 |
| B - 707        |                                | 396828.8  | 875790.8  | -1.8 |
| B - 708 (DH)   |                                | 396829.7  | 875885.7  | -1.4 |
| B - 709        |                                | 396760.5  | 875840.6  | -1.3 |
| B - 710 (DH)   |                                | 397086.9  | 875792.9  | -1.3 |
| B - 710 (DH) R |                                | 397087.15 | 875781.85 | -1.3 |
| B - 710 G (DH) |                                | 397075.1  | 875792.2  | -1.4 |
| B - 711        |                                | 397085.6  | 875884.8  | -1.1 |
| B - 712        |                                | 397082.1  | 876022.1  | -1.1 |
| B - 713        |                                | 397179.3  | 875959.0  | -1.1 |
| B - 714        |                                | 397258.7  | 876020.6  | -1.0 |
| B - 715        |                                | 397259.2  | 875908.5  | -0.9 |
| B - 716        |                                | 397214.3  | 875872.7  | -1.1 |
| B - 717        |                                | 397287.0  | 875873.1  | -1.1 |
| B - 718        |                                | 397190.9  | 875792.6  | -1.2 |
| B - 719        |                                | 397293.2  | 875791.3  | -1.1 |
| B - 720 (DH)   |                                | 397396.7  | 875791.1  | -0.9 |
| B - 720 G (DH) |                                | 397385.2  | 875794.0  | -1.1 |
| B - 721        |                                | 397338.0  | 876120.1  | -1.5 |
| B - 722        |                                | 397434.2  | 875979.6  | -1.0 |
| B - 723        |                                | 397421.2  | 875675.4  | -1.0 |

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|               |                             |           |           |      |
|---------------|-----------------------------|-----------|-----------|------|
| B - 724       |                             | 397325.5  | 875663.2  | -0.7 |
| B - 725       |                             | 397099.8  | 876111.2  | -1.0 |
| B - 726       |                             | 396875.6  | 876003.9  | -1.4 |
| B - 727       |                             | 397117.7  | 875666.1  | -1.3 |
| B - 728       |                             | 397070.5  | 875620.1  | -1.4 |
| B - 729       |                             | 396970.7  | 875493.4  | -1.2 |
| B - 730       |                             | 396868.0  | 875621.0  | -1.0 |
| B - 731       |                             | 396645.6  | 875423.1  | -1.5 |
| B - 732       |                             | 396412.1  | 875682.4  | -1.0 |
| B - 733       |                             | 396117.5  | 875897.5  | -1.0 |
| B - 734       |                             | 395833.2  | 875546.3  | -0.6 |
| B - 735       |                             | 395824.7  | 875689.4  | -0.8 |
| B - 736       |                             | 395808.5  | 876107.1  | -0.5 |
| B - 737       |                             | 395803.7  | 876237.8  | -0.6 |
| B - 738       |                             | 397728.1  | 875607.3  | 0.1  |
| B - 739       |                             | 396962.9  | 876149.6  | -1.6 |
| B - 740 (DHT) | Top of PVC Pipe             | 397136.7  | 875842.04 | 0.5  |
| B - 740 (DHT) | Ground adjacent to PVC Pipe | 397137.16 | 875841.68 | -0.8 |
| B - 802       |                             | 398817.1  | 876265.7  | -1.5 |
| B - 805       |                             | 396883    | 877239.5  | -1.6 |
| B - 806       |                             | 395288.3  | 877237.4  | -0.4 |
| B - 807       |                             | 395277.5  | 875987.8  | -0.7 |
| B - 808       |                             | 396204.9  | 875331.8  | -1.0 |
| B - 809       |                             | 397028.0  | 875151.3  | -1.3 |
| B - 810       |                             | 397806.7  | 875012.4  | -1.2 |
| B - 811       |                             | 398325.2  | 874953.8  | -1.4 |
| B - 812       |                             | 398913.2  | 875043.1  | -1.4 |
| B - 813       |                             | 399047.6  | 876097.3  | -1.3 |
| B - 814       |                             | 399138.9  | 877404.8  | 9.0  |

## **Summary of Locations and Elevations of Geotechnical Investigation Sites**

surveys made between April 21, 2008 and June 24, 2008

### **Cone Penetration Test**

|         |                                     |           |           |      |
|---------|-------------------------------------|-----------|-----------|------|
| C - 601 |                                     | 397129.8  | 876361.3  | -0.1 |
| C - 602 | <i>abandoned, see B - 640 (DHT)</i> | 397115.6  | 876534.6  | -0.5 |
| C - 701 |                                     | 397100.21 | 875839.25 | -1.4 |
| C - 702 |                                     | 397149.4  | 876042.2  | 0.3  |

### **Observation Wells**

|          |                 |          |          |      |
|----------|-----------------|----------|----------|------|
| OW 606 L | NE Cor Conc Pad | 396980.9 | 876733.7 | -1.5 |
| OW 606 L | Top PVC Pipe    | 396979.9 | 876732.6 | 1.3  |
| OW 606 U | NE Cor Conc Pad | 396939.1 | 876736.0 | -1.8 |
| OW 606 U | Top PVC Pipe    | 396938.0 | 876734.8 | 1.4  |
| OW 606 D | NE Cor Conc Pad | 396961.8 | 876714.2 | -1.6 |
| OW 606 D | Top PVC Pipe    | 396962.8 | 876712.9 | 1.6  |
|          |                 |          |          |      |
| OW 621 L | NE Cor Conc Pad | 397365.4 | 876971.4 | 0.1  |
| OW 621 L | Top PVC Pipe    | 397364.5 | 876970.0 | 3.1  |
| OW 621 U | NE Cor Conc Pad | 397376.4 | 876931.3 | 0.6  |
| OW 621 U | Top PVC Pipe    | 397375.8 | 876930.0 | 3.9  |
|          |                 |          |          |      |
| OW 636 L | NE Cor Conc Pad | 395292.1 | 877258.0 | -0.4 |
| OW 636 L | Top PVC Pipe    | 395290.8 | 877257.2 | 3.0  |
| OW 636 U | NE Cor Conc Pad | 395286.9 | 877216.8 | -0.6 |
| OW 636 U | Top PVC Pipe    | 395285.8 | 877215.7 | 2.8  |
|          |                 |          |          |      |
| OW 706 L | NE Cor Conc Pad | 396979.2 | 875905.6 | -1.0 |
| OW 706 L | Top PVC Pipe    | 396978.2 | 875904.6 | 2.2  |
| OW 706 U | NE Cor Conc Pad | 396940.8 | 875897.1 | -1.5 |
| OW 706 U | Top PVC Pipe    | 396940.1 | 875895.7 | 1.7  |
| OW 706 D | SE Cor Conc Pad | 396961.2 | 875865.1 | -1.1 |
| OW 706 D | Top PVC Pipe    | 396960.1 | 875864.4 | 2.2  |
|          |                 |          |          |      |
| OW 721 L | NE Cor Conc Pad | 397322.6 | 876121.2 | -1.2 |
| OW 721 L | Top PVC Pipe    | 397321.5 | 876120.3 | 2.0  |

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|                    |                 |          |          |      |
|--------------------|-----------------|----------|----------|------|
| OW 721 U           | NE Cor Conc Pad | 397362.0 | 876122.8 | -1.1 |
| OW 721 U           | Top PVC Pipe    | 397361.2 | 876121.4 | 2.0  |
| OW 735 L           | NE Cor Conc Pad | 395825.2 | 875670.9 | -0.7 |
| OW 735 L           | Top PVC Pipe    | 395824.3 | 875669.6 | 2.7  |
| OW 735 U           | NE Cor Conc Pad | 395824.3 | 875710.3 | -0.5 |
| OW 735 U           | Top PVC Pipe    | 395823.3 | 875709.2 | 2.8  |
| OW 802 L (B-802)   | NE Cor Conc Pad | 398818.3 | 876266.8 | -1.2 |
| OW 802 L (B-802)   | Top PVC Pipe    | 398817.1 | 876265.7 | 2.1  |
| OW 802 U           | NE Cor Conc Pad | 398821.4 | 876244.8 | -1.2 |
| OW 802 U           | Top PVC Pipe    | 398820.2 | 876243.7 | 2.2  |
| OW 805 L (B-805 L) | NE Cor Conc Pad | 396884.2 | 877240.4 | -1.5 |
| OW 805 L (B-805 L) | Top PVC Pipe    | 396883.0 | 877239.5 | 2.2  |
| OW 805 U (B-805 U) | NE Cor Conc Pad | 396841.9 | 877242.1 | -1.6 |
| OW 805 U (B-805 U) | Top PVC Pipe    | 396842.8 | 877240.9 | 1.2  |
| OW 809 L           | NE Cor Conc Pad | 397009.2 | 875153.1 | -0.9 |
| OW 809 L           | Top PVC Pipe    | 397007.9 | 875152.3 | 2.4  |
| OW 809 U           | NE Cor Conc Pad | 397047.1 | 875153.1 | -0.7 |
| OW 809 U           | Top PVC Pipe    | 397045.8 | 875152.4 | 2.5  |
| OW 812 L           | NE Cor Conc Pad | 398894.2 | 875046.2 | -1.2 |
| OW 812 L           | Top PVC Pipe    | 398892.8 | 875045.5 | 2.1  |
| OW 812 U           | NE Cor Conc Pad | 398935.4 | 875044.2 | -0.8 |
| OW 812 U           | Top PVC Pipe    | 398933.9 | 875043.5 | 2.2  |

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|                         |
|-------------------------|
| <b><i>Test Pits</i></b> |
|-------------------------|

|        |          |          |      |
|--------|----------|----------|------|
| TP 601 | 397105.6 | 876035.8 | -1.4 |
| TP 701 | 396988.2 | 875508.5 | -1.4 |

|                              |
|------------------------------|
| <b><i>Stilling Wells</i></b> |
|------------------------------|

|        |          |          |      |
|--------|----------|----------|------|
| SW - 1 | 396386.8 | 874995.1 | -2.7 |
| SW - 2 | 395222.7 | 877124.0 | -2.2 |