



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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January 12, 2007

M. A. McBurnett, Vice President
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SUBJECT: SITE VISIT TO THE SOUTH TEXAS PROJECT SITE TO OBSERVE
COMBINED LICENSE PRE-APPLICATION SUBSURFACE INVESTIGATION
ACTIVITIES (PROJECT NO. 749)

Dear Mr. McBurnett:

On December 4-6, 2006, an Nuclear Regulatory Commission (NRC) inspector from Region II conducted a visit to the South Texas Project site accompanied by members of the NRC's Office of New Reactors. The purpose of the visit was to observe combined license (COL) pre-application subsurface investigation activities being conducted to obtain geotechnical/seismic data to support a COL application for two new nuclear power plants. These observations will provide background information for NRC's future review of the expected COL application for the South Texas Project site.

A summary of the site visit that includes a list of NRC participants and persons with whom discussion were held is enclosed.

Sincerely,

/RA/

Mark S. Lesser, Chief
Construction Inspection Branch
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Project No. 749

Enclosure: As stated

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ADAMS: ☐ Yes ACCESSION NUMBER: **ML070170422**

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SITE VISIT TO THE SOUTH TEXAS PROJECT SITE
TO OBSERVE COMBINED LICENSE PRE-APPLICATION
SUBSURFACE INVESTIGATION ACTIVITIES
PROJECT NO. 749

Purpose of Visit:

A site visit was conducted on December 4-6, 2006 by Nuclear Regulatory Commission (NRC) Regional and Office of New Reactors (NRO) staff. An NRC inspector observed combined license (COL) pre-application subsurface investigation activities conducted to obtain geotechnical and seismic data at the proposed location of two new nuclear power plants at the South Texas Project site. The visit was an on-site observation and information gathering trip in which the staff used the following inspection manual chapters and procedures as guidance:

- NRC Inspection Manual Chapter 2502, "Construction Inspection Program: Pre-Combined License (PRE-COL) Phase"
- NRC Inspection Procedure 35004, "Pre-Docketing Early Site Permit Quality Assurance Controls Inspection"
- NRC Inspection Procedure 45051, "Geotechnical/Foundation Activities Procedure Review"

The visit served to ascertain whether adequate quality assurance controls had been established and were being implemented and to assess whether the technical requirements for geotechnical exploration for a COL had been adequately addressed through specifications, drawings, and work procedures.

Principal Persons Contacted:

N. Barclay, QA Engineer, GE Nuclear
J. Conly, Licensing Engineer, STPNOC
G. Day, Hydrogeologist, Bechtel
G. Ehlert, Civil Engineer, GE Nuclear
G. Gibson, Licensing Manager, STPNOC
R. Gibson, Assistant Project Engineer, Bechtel
R. Jolly, Project QA Manager, Bechtel
A. Kottenstette, Quality Assurance Representative, MACTEC
B. Orth, Geotechnical Engineer, Bechtel
M. Smith, Quality Supervisor, STPNOC
J. Stone, CTC, SunTech
M. Sufnarski, Project Manager, MACTEC
C. Wang, Geotechnical Engineer, Bechtel
K. White, Project Principal, MACTEC
G. Winebrenner, Nuclear Programs Director, MACTEC
R. Wolters, QA Manager, GE Nuclear

NRC Inspector:

J. Tapia, P.E., Senior Reactor Inspector, Region II

NRC Accompanying Personnel:

Y. Li, Geophysicist, Office of New Reactors
 K. See, Hydrologist, Office of New Reactors
 G. Stirewalt, Geologist, Office of New Reactors
 G. Wunder, Project Manager, Office of New Reactors

Background:

By letter dated June 19, 2006, the South Texas Project Nuclear Operating Company (STPNOC) informed the NRC that it had selected the South Texas Project site to be the subject for a COL application, with the intent of submitting the application in late 2007. A COL is a combined construction permit and operating license with conditions for a nuclear power facility pursuant to 10 CFR Part 52 Subpart C. STPNOC contracted Bechtel as the nuclear services provider that will develop the COL application and MACTEC to conduct the site studies and perform the sample accumulation and testing required for the application.

Overview of Subsurface Investigation Activities Discussed and/or Observed:

STPNOC planned to use the subsurface investigations described below to provide data to determine site suitability for an COL. STPNOC's current subsurface investigation activities included areas which would be the site of cooling towers, yard structures and the reactor sites. The site investigation was expected to last 14 weeks and include 125 borings that will total approximately 15,000 feet of drilling when complete. The site is characterized by inter-bedded clay and sand strata with bedrock at approximately 6000 feet deep.

The scope of the site characterization activities included various field and geotechnical laboratory tests. The following field testing methods were utilized:

- Standard Penetration Test Borings (SPT) (ASTM D1586-99, ASTM D4633-05)
- Undisturbed Sampling Using Shelby Tube Samplers (ASTM D1587-00)
- Seismic Shear and Compressional Velocity Measurements (P-S Logging)
- Borehole Geophysical Logging (ASTM D5753-05)
- Cone Penetrometer Test (CPT) Soundings (ASTM D5778-95)
- Pore Water Pressure Measurements
- Dynamic Shear Wave Measurements
- Pore Pressure Dissipation Tests
- Electrical Resistivity Testing (ASTM G57-95a)
- Field Permeability Testing (ASTM 4044-96, ASTM D4630-96)
- Ground Water Levels (ASTM D4750-87)
- Auger Boring Sampling (ASTM D1452-80)
- Soil Sample Classification (ASTM D2487-06, ASTM D2488-00)
- Preserving/Transporting of Samples (ASTM D4220-95)

The following laboratory testing standards were scheduled to be implemented at the MACTEC laboratory:

- Moisture Content (ASTM D2216-05)
- Unit Weight of Soil (MACTEC TP4)
- Specific Gravity of Soil (ASTM D854-06)
- Particle-Size Analysis (ASTM D422-63, ASTM D6913-04)
- Atterberg Limits (ASTM D4318-05)
- Chemical Analysis (EPA Method 300.0 & 150.0)
- Moisture-Density (ASTM D1557-02)
- Unconfined Compression Strength (ASTM D2166-00)
- Unconsolidated-Undrained Triaxial Compression (ASTM D2850-03a)
- Consolidated-Undrained Triaxial Compression (ASTM D4767-04)
- Direct-Shear Test (ASTM D3080-04)
- Consolidation Test (ASTM D2435-04)
- Laboratory Compaction (ASTM D698-00a, ASTM D1557-02)
- Specific Gravity of Soil Solids (ASTM D854-06)
- Laboratory California Bearing Ratio (ASTM D1883-05)
- Resonant Column/Torsional Shear Test (University of Texas Procedure)

The inspector reviewed appropriate quality control and technical site characterization procedures and verified that the following attributes were adequate:

- Approved and documented instructions, procedures, and drawings were used for site characterization activities.
- Measures were implemented for test control and control of special processes and engineering direction was readily available.
- Measures existed to identify and resolve non-conformances and conditions adverse to quality.
- For site characterization activities performed by vendors, appropriate oversight and procurement controls were implemented.

The inspector reviewed and assessed the adequacy of the following:

- Bechtel Engineering Specification No. 25293-401-3PS-CY00-00001, Rev. 000, "Subsurface Investigation and Laboratory Testing for STP Units 3 & 4."
- MACTEC Quality Assurance Project Document, Rev. 0
- MACTEC STP COL Project Geotechnical Work Plan, Rev. 0
- MACTEC QA Surveillance Report Nos. ST-1 through ST-7.
- Bechtel Quality Services Department Procedure No. 2QP-Q01N-181, Rev. 1, "Project Quality Assurance Surveillances."
- Bechtel Quality Oversight Plan for Subsurface Investigation and Laboratory Testing.
- Bechtel QA Surveillance Report No. 25293-QSSS-06-001
- Bechtel QA Surveillance Report No. 25293-QSSS-06-002
- General Electric STP Surveillance Report No. 2006-01
- STPNOC Quality Monitoring Report MN-06-0-20300
- STPNOC Quality Monitoring Report MN-06-0-19496
- STPNOC Quality Monitoring Report MN-06-0-20280
- STPNOC Quality Monitoring Report MN-06-0-19810

- STPNOC Quality Monitoring Report MN-06-0-19776
- Selected instrumentation and equipment calibration records.
- Surveying records.
- Qualifications of personnel associated with geotechnical activities.
- Sample storage facilities.
- Selected field logs and data sheets.

Drilling and Sampling Observed:

Observation of work in progress included seismic logging and boring penetration testing activities. The inspector verified that work was being performed in accordance with appropriate procedures. Nine drilling rigs and one CPT rig were operating during the site visit. Each drilling operation was controlled by a MACTEC rig geologist and each rig worked to an individual work instruction that was generated each day. Interviews were conducted with rig geologists, rig operators and technicians. Personnel were knowledgeable of applicable quality assurance and technical requirements.

The inspector observed the following activities:

- P-S Logging at boring B-428DH
- SPT and Split-Spoon Sampling at boring B-402DH
- SPT and Split-Spoon Sampling at boring B-330
- CPT and Pore Pressure Dissipation Testing at boring C-410

The observed testing was in accordance with applicable ASTM standards and procedure requirements. The MACTEC rig geologist field boring logs were extensive in detail and provided a good record of test results. Samples were collected and stored in accordance with standard practices for preserving and transporting soil samples. The sample storage facility was located in a locked warehouse within the owner controlled area. In addition to jar sample collection, each sample was photographed and each photograph was logged.

The preliminary results of P-S logging shear wave measurements indicated that the results were below 1000 feet-per-second in some cases. These results will require further analysis or additional testing to ensure that foundation design assumptions are adequate.

The QA program implementation was evaluated by reviewing nonconformance reports (NCRs) generated to date. Twenty-five NCRs had been issued by MACTEC. The inspector determined that a low threshold for issuing a NCR was evident, indicating a robust implementation of the QA Program.

Geotechnical subsurface investigation activities were being adequately controlled with an appropriate level of supervisory and Quality Assurance oversight and in accordance with procedural requirements and industry standards.