



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
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ATLANTA, GEORGIA 30303-8931

October 5, 2006

J. A. "Buzz" Miller
Senior Vice President, Nuclear Development
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
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SUBJECT: SOUTHERN NUCLEAR OPERATING COMPANY, NRC INSPECTION OF
APPLICANT AND CONTRACTOR QUALITY ASSURANCE ACTIVITIES
INVOLVED WITH PREPARATION OF THE APPLICATION FOR AN EARLY
SITE PERMIT, REPORT 05200011/2006001

Dear Mr. Miller:

On September 1, 2006, the Nuclear Regulatory Commission (NRC) completed an inspection of Quality Assurance (QA) procedures and controls at your offices in Birmingham, Alabama. The enclosed report presents the results of that inspection.

The team concluded that the QA procedures and controls implemented by Southern Nuclear Operating Company, its primary contractor, Bechtel, and Bechtel's sub-contractors were equivalent in substance with the criteria contained in Section 17.1.1, "Early Site Permit Quality Assurance Controls," of RS-002, "Processing Applications for Early Site Permits."

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Mark S. Lesser, Branch Chief
Division of Construction Inspection

Docket No: 52-011

Enclosure: Report Details

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No. 52-011

Report No. 52-011/2006001

Licensee: Southern Nuclear Company

Facility: Early Site Permit for new nuclear generation at the Vogtle site

Location: Southern Nuclear - Inverness Center
40 Inverness Center Pkwy
Birmingham, AL 35242

Dates: August 28 - September 1, 2006

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Approved By: Mark S. Lesser, Branch Chief
Division of Construction Inspection

Enclosure

EXECUTIVE SUMMARY

Vogtle Early Site Permit
NRC Inspection Report 52-011/2006001

This inspection team reviewed aspects of applicant and contractor quality assurance (QA) and quality control (QC) activities involved with preparation of the application for the Vogtle Early Site Permit (ESP).

The team concluded that the QA procedures and controls used by the applicant, Southern Nuclear Operating Company; the primary contractor, Bechtel Power Corporation; and sub-contractors were equivalent in substance to the criteria contained in Section 17.1.1, "Early Site Permit Quality Assurance Controls," of Review Standard 002, "Processing Applications for Early Site Permits." No findings of significance were noted.

REPORT DETAILS

Status

On August 15, 2006, the NRC received an application from Southern Nuclear Operating Company, Inc. (SNC), for an early site permit (ESP) in accordance with 10 CFR Part 52, Subpart A, "Early Site Permits."

The site selected for the early site permit is the Vogtle Electric Generating Plant (VEGP) site in eastern Burke County, Georgia; approximately 26 miles southeast of Augusta, Georgia and 100 miles northwest of Savannah, Georgia; directly across the Savannah River from the U.S. Department of Energy's Savannah River Site in Barnwell County, South Carolina. VEGP Units 1 and 2 are located on the VEGP site (NRC Docket Numbers 50-424/425). Plant Wilson, a six-unit oil-fueled combustion turbine facility owned by Georgia Power Company (GPC), is also located on the VEGP site.

The new plant footprint selected for the ESP is adjacent to the west side of the VEGP Units 1 and 2, and is generally the area that was originally designated for VEGP Units 3 and 4 when the plant was first proposed.

A Site Safety Analysis Report (SSAR) supports SNC's application for the early site permit. Quality assurance measures that were used during preparation of the application were briefly summarized in Chapter 17, "Quality Assurance." The quality assurance program used for the development of the VEGP ESP application was described in the SNC Nuclear Development Quality Assurance Manual (NDQAM). SNC stated that this manual, and associated implementing procedures, provided for control of SNC activities that have the potential to affect the quality of safety-related nuclear plant structures, systems, and components (SSCs) of the proposed new units. The SNC NDQAM was included as Appendix 17.1A to the application.

This inspection was conducted to assess the validity of the SSAR data by determining whether the quality assurance controls, applicable to elements of the early site permit activities, were implemented without substantive deviations. This inspection was performed using the guidance contained in NRC Inspection Procedure 35006, "Early Site Permit Quality Assurance Controls Assessment and Conclusion."

Under 10 CFR 52.18, Standard for Review of Applications," the staff will review early site permit applications in accordance with the applicable regulation of 10 CFR Part 50 and its appendices and Part 100 as they apply to construction permits. The current regulations do not require implementation of a quality assurance program compliant with Appendix B to 10 CFR Part 50. However, SNC is expected to implement quality assurance controls equivalent in substance to the controls described in Appendix B to 10 CFR Part 50 to provide reasonable assurance that information derived from early site permit activities that would be used in design and/or construction of SSCs important to safety would support satisfactory performance of such SSCs in service. Review Standard 002, "Processing Applications for Early Site Permits," which references Section 171.1, "Early Site Permit Quality Assurance Controls," contains staff guidance for conducting the review quality assurance controls applied to the early site permit.

QUALITY ASSURANCE

1. QA MANUAL/CONTROL DOCUMENTS

a. Inspection Scope

The team reviewed QA manual and QA control documents utilized by SNC and its contractors to obtain information related to the QA controls applied to ESP activities. This review was conducted to ensure that ESP activities associated with site safety were controlled by QA measures sufficient to provide reasonable assurance that information used as input for design or construction of future systems, structures, and components (SSCs) important to safety, would not adversely impact their ability to perform satisfactorily in service. The team verified if the quality-related activities were equivalent in substance to the controls described in Appendix B to 10 CFR Part 50, and consistent with the guidance contained in Section 17.1.1, "Early Site Permit Quality Assurance Controls," of Review Standard (RS) 002.

b. Observations and Findings

General

Southern Nuclear Operating Company, Inc., acting on behalf of itself and the owners of the VEGP site, submitted the application for an early site permit application. SNC selected Bechtel Power Corporation (Bechtel) as its principal contractor to assist with preparing the SSAR portion of the ESP application and Tetra Tech NUS, Inc. (TtNUS), to assist with preparing the Environmental Report portion. Bechtel is an engineering and construction contractor. TtNUS is an environmental and engineering consulting company. Bechtel and TtNUS supplied personnel, systems, project management, and resources to work on an integrated team with SNC.

In addition to Bechtel and TtNUS, contractual relationships were established with several specialized contractors and consultants to assist in developing the ESP application.

MACTEC Engineering and Consulting, Inc., (MACTEC) was subcontracted by SNC to perform geotechnical field investigations and laboratory testing in support of SSAR Section 2.5, "Geology, Seismology, and Geotechnical Engineering." That effort included performing standard penetration tests, downhole geophysical logging, and laboratory tests of soil and rock samples; installing ground water observation wells; and preparing a data report.

William Lettis and Associates, Inc. (WLA) performed geologic mapping and characterized seismic sources in support of SSAR Section 2.5, including literature review, geologic field reconnaissance, review and evaluation of existing seismic source characterization models, identification and characterization of any new or different sources, and preparation of the related SSAR sections.

Risk Engineering, Inc. (REI) performed probabilistic seismic hazard assessments and related sensitivity analyses in support of SSAR Section 2.5. These assignments included sensitivity analyses of seismic source parameters and updated ground motion attenuation relationships, and development of updated safe shutdown earthquake (SSE) ground motion values.

(1) *Southern Nuclear Operating Company*

On November 4, 2005, SNC submitted Version 1.0 of the Early Site Permit Quality Assurance Manual, dated May 11, 2005. The NRC staff reviewed the document and SNC received comments from NRC on December 2, 2005. Most of the work related to field activities was accomplished under Version 1.0. The staff used this version of the manual when reviewing documents and activities associated with the ESP, as most activities were conducted in the time frame this document was in place.

The Nuclear Development (ND) organization was subsequently created. The quality assurance manual was revised to be in alignment with the organization and to include combined license (COL) construction and startup activities. SNC provided NRC staff with the pre-docketed quality assurance manual on June 23, 2006. This was Version 2.0, "Nuclear Development Quality Assurance Manual," dated June 16, 2006. This version was developed to incorporate quality assurance requirements for ESP and COL activities, which was beyond the scope of requirements needed for this inspection.

During the inspection, the team focused on ensuring that SNC implemented quality assurance measures equivalent in substance to the controls described in Appendix B to 10 CFR Part 50. This review was performed to provide reasonable assurance that the information derived from ESP activities that would be used in design and/or construction of SSCs important to safety would support satisfactory performance of such SSCs in service. The guidance for ensuring reasonable assurance of quality is contained in 17.1.1 of RS-002. The team utilized specific guidance for the performance of the inspection that is contained in Inspection Procedure 35006, "Post-Docketing Early Site Permit Quality Assurance Controls Inspection."

SNC Quality Assurance Manual

The staff reviewed Enclosure AR-06-1308, "Southern Company Nuclear Development Quality Assurance Manual." The Nuclear Development Quality Assurance Manual (NDQAM) was considered the top-level policy document that established the quality assurance policy and assigned major functional responsibilities. The NDQAM stated that the quality assurance requirements met American Society of Mechanical Engineers (ASME) NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications," Parts I and II, except as specified in the NDQAM. The NRC staff, in a letter dated December 2, 2005, entitled, "Pre-Application Review of Southern Nuclear Operating Company Early Site Permit Quality Assurance Program," provided SNC the results of a sufficiency review of the NDQAM. The sufficiency review identified several areas where the NDQAM should be revised in order to meet the guidance contained in Section 17.1.1 of RS-002. The NRC staff referenced the sufficiency review to ensure that SNC adequately followed the guidance of Section 17.1.1 of RS-002 during the

inspection and had implemented the areas of concern identified in the sufficiency review.

ESP site specific safety-related design basis activities were defined as those activities, including sampling, testing, data collection, and supporting engineering calculations and reports that will be used to determine the bounding physical parameters of the site. The development of the SNC ESP application involved site testing, data collection and calculations that may create or bound safety-related design basis data. Site testing and data collection of information pertaining to the physical characteristics of the site that have the potential to affect safety-related design were considered safety-related activities. In addition, calculations and other engineering data that bounds or characterizes the site was classified as safety-related activities.

SNC procured the following contractors for ESP engineering support and design activities.

- Bechtel Power Corporation (Bechtel) - Site Safety Analysis Report and Design Services
 - William Lettis & Associates, Inc. (WLA) - Geotechnical and Geophysical Analysis
 - Risk Engineering, Inc. (REI) - Seismic Analysis
- MACTEC Engineering and Consulting, Inc. (MACTEC) - Soil Analysis and Site Borings
- Bay Geophysical, Inc. (BGI) - Seismic Reflection and Refraction Maps
- Savannah River National Laboratory (SRNL) - Soil Analysis
- Tetra Tech, Inc. (TtNUS) - Environmental Report
 - Third Rock - Endangered Species Study (non-safety related)
 - New South Associates - Archeological Study (non-safety related)

The team reviewed the QA manuals or applicable QA control framework documents for each of the companies noted above except Third Rock and New South Associates. TtNUS was contracted by SNC to conduct various environmental engineering services related to plant siting and to develop the environmental report for the ESP application. TtNUS subcontractors, Third Rock and New South Associates, performed endangered species and archeological studies, which were considered within the scope of environmental work and therefore, outside the scope of the site safety review.

(2) Bechtel Quality Assurance Manual

SNC selected Bechtel as the lead contractor for ESP application activities. The team reviewed Bechtel's "Nuclear Quality Assurance Manual," Revision 4, dated November 1,

2002. Bechtel provided a Nuclear Quality Assurance Manual (NQAM), which identified requirements for the development of quality program projects, such as the SNC ESP application. The QA program policies contained in the NQAM were designed to meet the requirements of Appendix B to 10 CFR Part 50, and contained QA policies corresponding to each of the Appendix B criteria. The NQAM was used to develop a task-specific "Quality Assurance Program Plan," Revision 0, dated April 22, 2005. The stated purpose of the Quality Assurance Program Plan (QAPP) was to establish the quality program interface between the Bechtel NQAM and SNC's specific requirements applicable to the ESP application development activities. This QAPP specifically identified the QA policies applicable to the SNC ESP project. The NQAM was developed for the full scope of Bechtel's services; while the QAPP specifically identified QA policies applicable to Bechtel's scope of work on the SNC ESP project.

The QA program established in the QAPP was applicable to the quality related activities Bechtel performed associated with the preparation of the SNC ESP application.

Modifications to the QA policies, as appropriate, reflected unique project or applicant requirements. In the event of conflicts, it was noted that the QAPP took precedence over the NQAM.

(3) MACTEC Engineering and Consulting Quality Assurance Manual

The team reviewed the MACTEC, "Quality Assurance Manual," Revision 2, dated June 17, 2005. MACTEC was subcontracted by SNC. The general format of the Quality Assurance Manual (QAM) followed the criteria for quality assurance outlined in Appendix B to 10 CFR Part 50 and ASME NQA-1-1994. Provisions were included for project specific requirements. These requirements were incorporated through the "MACTEC Quality Assurance Project Document," (QAPD) Revision 2, dated February 20, 2006. The QAPD was used to incorporate project-specific quality requirements. All reports, proposals, and test data were required to have secondary review. Qualified personnel were required to perform the review for all services requiring engineering or scientific evaluation, interpretation, or judgement. The project manager was responsible for review and approval of the MACTEC QAPD. SNC required MACTEC to develop a project specific QAPD in order to ensure that applicable 10 CFR Part 50, Appendix B requirements were met.

(4) Risk Engineering, Inc.

Bechtel subcontracted to REI to obtain computational and expert consulting services in performing probabilistic seismic hazard and sensitivity analyses for the Vogtle site. The team reviewed the REI QA manual and Software Quality Assurance Plan (SQAP) to verify that these quality documents covered all activities related to REI's services that were important to safety specified in the Bechtel service requisition.

(5) William Lettis & Associates, Inc.

Services for seismic and geotechnical evaluation of the site were provided by WLA under a subcontract with Bechtel. Because WLA did not possess a quality assurance program that met the requirements of 10 CFR Part 50, Appendix B, WLA performed work in accordance with Bechtel's quality assurance program. The team reviewed selected project instructions prepared by WLA and reviewed by Bechtel to provide guidelines for conducting seismic and geotechnical activities. The team verified that the project instructions required that work be performed under the Bechtel quality assurance program.

(6) Savannah River National Laboratory Augmented Quality Controls

SRNL did not have a quality assurance manual and did not work under SNC's NDQAM. However, SNC performed an evaluation of SRNL's augmented quality requirements to verify appropriate implementation. A memorandum entitled, "Work for Others Agreement for the Savannah River National Laboratory to Provide Services to Southern Nuclear Company," dated February 15, 2006, outlined SNRL's activities. The scope of work involved laboratory testing on soil samples to determine absorption values for certain radioactive isotopes, geochemical characterization of groundwater samples, and sand/silt clay content. The SNC Vogtle Deployment Licensing (VDL) group requested SRNL because of its unique expertise in the area of radiological measurements in the environment. The team reviewed the SNC purchase order (PO) and found that it specified augmented quality requirements to be used.

(7) Bay Geophysical, Inc. Augmented Quality Controls

BGI did not work under SNC's or its own quality assurance manual. SNC did a Purchase Order Requisition Sole Source Justification. The team reviewed the Purchase Order Requisition Sole Source Justification memorandum entitled, "Provide Seismic Reflection and Refraction Surveys for Early Site Permit Geotechnical Investigation Work at the Vogtle Site January - March 2006," dated December 9, 2005. The PO requested the proper industry standards for the work conducted. Justification was based on the capability of this supplier compared to others being able to perform all required tasks. The work requested was for P-wave reflection and P-wave refraction surveys to delineate the Pen Branch Fault. Specifically, BGI analyzed the location, dip direction/angle and offset of the top of bedrock at the proposed site. Also, the displacement of unconsolidated sediments (coastal plain) above the fault was to be analyzed. The team reviewed the SNC PO and found that it specified augmented quality requirements to be used.

c. Conclusions

The SNC NDQAM was basically subdivided into the 18 criteria of 10 CFR Part 50, Appendix B. In addition, the team determined that the QA measures implemented by Bechtel, MACTEC, REI, and other subcontractors were adequate. The team also determined that the augmented quality controls applied to SRNL and BGI were adequate for the scope of work conducted by the contractors. Therefore, the team concluded that the QA controls implemented by SNC and its contractors were equivalent

in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance outlined in Section 17.1.1 of RS-002.

2. QA CONTROL IMPLEMENTATION

2.1 QA Organization

a. Inspection Scope

For specific organizations with QA/QC responsibilities, the team conducted the following reviews:

- verified that individuals responsible for implementation of the QA/QC procedures or instructions have been identified and areas of responsibility and authority were defined;
- determined if qualification requirements for QA personnel had been established for all levels of the organization;
- assessed the controls for the review and approval of QA procedures and instructions; and
- reviewed training requirements and records related to ESP activities to ensure personnel completed requisite training.

The team verified the adequacy of the QA organizations and indoctrination, training, and qualification programs as described below. This review was conducted to determine if requirements for quality-related activities were equivalent in substance to the controls described in Appendix B to 10 CFR Part 50 and consistent with the guidance contained in Section 17.1.1 of RS-002.

b. Observations and Findings

(1) Southern Nuclear Operating Company

SNC developed the ND organization reporting to the Senior Vice President of ND. Within the ND organization, the VDL organization was developed to manage preparation of the ESP and provide oversight of contractors. SNC developed procedures specific to ESP and also utilized existing QA procedures where appropriate. The NDQAM was developed to define organizational structural and define responsibilities along with ND Advanced Reactor Licensing (ARL) procedures for guidance, which were reviewed by the team. Examples reviewed included ND-ARL-001, "Vogtle Deployment Licensing," Version 1; and ND-ARL-006, "ARL Implementing Procedure Reference Document," Version 1. SNC utilized existing procedure TS/CS-001, "Procedure Preparation and Control," Version 2, for procedure control and approval. In addition, existing procedure TS-001, "Requisition of Engineering Services," Version 23, was utilized for management and QA of contracted services. The team also reviewed these procedures. In addition to program and procedure reviews, the team conducted interviews of personnel responsible for ESP development. The team noted that organizational responsibilities

were clearly defined and the QA organization was sufficiently independent from the project organization.

Section 2.6 "Personnel Qualifications," of SNC's NDQAM stated that personnel assigned to implement elements of the NDQAM shall be capable of performing their assigned tasks. SNC established and maintained formal indoctrination and training programs for personnel performing, verifying, or managing activities within the scope of the NDQAM. To this end, SNC established ESP Project training and created the Qualification C-SP-ESP-Orientation Training Completion Form, which was used to track training of personnel working on the ESP Project. The team verified that key QA personnel involved with the project had records of training completion.

(2) Bechtel Power Corporation

SNC contracted with Bechtel for a major role in development of the ESP application. The Bechtel NQAM provided organizational information and guidance for preparation, review, approval, and control of instructions, procedures and drawings associated with the ESP. In addition, various procedures were developed for ESP activities and were included in the Project Engineering Procedures Manual (PEPM) for SNC, 25144-000-GPP-00001, Rev. 1. Bechtel procedures for development and control of documents included SDP-G01-00001, "The EDP System," Rev. 4, and 25144-001-3DP-G04-00022, "Licensing Documents for SNC Early Site Permit Project," Rev. 1. The team reviewed each of these documents. The team noted that organizational responsibilities, and QA responsibilities were clearly defined.

Bechtel's training requirements for ESP Project personnel were identified in procedure 3DP-G05G-00034 "Quality Indoctrination/Orientation and Training," Rev. 2, dated February 28, 2005, from the PEPM. The training requirements for key engineering and supervisory personnel included training in all procedures contained in the project's PEPM. Personnel with WLA, a Bechtel subcontractor, were also included within the scope of this requirement because this subcontractor was working under Bechtel's QA program. The team reviewed a sample of records for Bechtel and WLA personnel and verified that training requirements had been met.

(3) MACTEC Engineering and Consulting, Inc.

SNC subcontracted with MACTEC to obtain geological testing support. MACTEC developed the QAPD to provide guidance for organization responsibilities, QA oversight, and training. The team reviewed these documents for the adequacy of the QA measures. The team noted that the MACTEC quality assurance organization was independent of the organizations performing field or lab work.

Section 20.5.2, "Quality Assurance Program Training," of MACTEC's QAM stated that personnel acquire and maintain a working knowledge of quality assurance requirements that apply to their work. To this end, MACTEC conducted quality assurance related training sessions specific for the ESP project for personnel involved with work at the Vogtle site. The team reviewed a sample of records for this training and determined that the training requirements were met.

(4) Risk Engineering, Inc.

Bechtel subcontracted with REI to support Bechtel's ESP efforts in performance of probabilistic seismic hazard and sensitivity analyses for the Vogtle site. REI is a small company with no stand-alone QA organization. However, REI had established QA guidance via 25144-000-V14-HAWC-0001-001, "Quality Assurance Manual," Rev. 6, which described organizational responsibilities and procedure controls.

REI appropriately delineated the functional personnel titles necessary to define the QA program, authority, and responsibility for QA controls.

According to Section 2.3, Procedure 3, "Training of Personnel for QA," from the Quality Assurance Manual, all personnel working on the project were required to receive QA training in three areas: general criteria, including applicable codes, standards, and company procedures; applicable QA program elements; and job responsibilities and authority. The team reviewed training records and verified that these requirements had been met.

c. Conclusions

Based on a review of the ESP QA implementing procedures and organizational responsibilities documents, the team determined that the QA organization and controls for review and approval of procedures for conducting ESP activities were adequate. The team also determined that SNC and contractor personnel had adequate training, and it was adequately documented. Therefore, the team concluded that the QA controls associated with organizational responsibilities; procedure review and approval and training requirements were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance outlined in Section 17.1.1 of RS-002.

2.2 Design Control

a. Inspection Scope

The team reviewed the implementation of QA design control attributes applicable to ESP activities at the proposed site. The team interviewed cognizant applicant and contractor personnel, and reviewed applicant, contractor, and subcontractor procedures to determine if requirements for quality-related activities were equivalent in substance to the controls described in Appendix B to 10 CFR Part 50 and consistent with the guidance contained in Section 17.1.1 of RS-002.

b. Observations and FindingsGeneral

The SNC NDQAM described the methods and established the QA program and administrative control requirements in accordance with 10 CFR Part 50, Appendix B. SNC subcontractors were subject to augmented quality specified by SNC in POs and/or SNC's quality assurance program and QAPD. WLA was subject to Bechtel's quality assurance program, which was previously approved by SNC. The team reviewed and

verified the adequacy of SNC and its contractor's design control activities, as described below.

(1) *Southern Nuclear Operating Company*

The team reviewed SNC procedures describing design control measures in the areas of design verification, computer software control, engineering drawings, design calculations, personnel training, design deviations, internal and external design control communications, design documentation, organizational responsibilities, and field changes and revisions as follows.

SNC NDQAM, Section 3, "Design Control," described an overview of the processes for design control, design changes, design verification, design records, and computer applications and digital equipment software. For design verification, the NDQAM required that procedures be established and implemented to assure appropriate verification methods are used, appropriate design parameters to be verified are chosen, acceptance criteria are identified, and verification is satisfactorily accomplished and documented. The NDQAM also referenced additional design control implementing procedures which are described below.

ND-ARL-001, Version 1.0, "Vogtle Deployment Licensing," described the organizational functions and responsibilities.

ND-ARL-002, Version 2.0, "ARL Records Management," described the process for handling engineering and licensing records.

ND-ARL-003, Version 1.0, "ARL Quality Criteria Document," described the applicable design criteria and QA requirements for supporting analysis, calculations, evaluation, and engineering activities in support of ESP activities.

ENG-010, "Specifications," described the process and instructions used for preparing or revising specifications to be utilized for the development, review, approval, and control of design, purchase, installation, and maintenance of systems, structures, and components at SNC's nuclear plants.

SNC procured Bechtel as the contractor to provide engineering management for the ESP (SNC PO No. SN05006). Design control measures established by Bechtel are further described below.

(2) *Bechtel Power Corporation*

Bechtel's QAPP established the quality program interface between the Bechtel NQAM and SNC's specific requirements and commitments. Bechtel stated in the QAPP that, for design control, quality-related activities associated with the preparation of the ESP application were performed in accordance with Bechtel's NQAM, with no additional modifications.

The team reviewed the Bechtel NQAM and procedures describing design control measures in the areas of design criteria, design interface control, design review and

verification, computer software control, engineering drawings, design calculations, design deviations, and organizational responsibilities as described below.

- The team reviewed Section 3 of Bechtel's NQAM. This section described the scope of the design control program and provided the controls for design activities associated with the preparation and review of design documents. Specifically, it described the requirements for the generation of design criteria, control of design interfaces, design verification, design change control, and computer programs.
- The team reviewed Section 3.1 of the NQAM, "Design Criteria," and Bechtel procedure 3DP-G04-00001, "Design Criteria," Rev. 1, and found that requirements for preparation, review, approval, and control of design criteria were clearly stated and in accordance with ANSI N45.2.11 and/or NQA-1. The team verified that the procedure provided the means to coordinate and communicate design criteria changes (including revision control) throughout any affected project discipline group. The procedure also specified internal document management requirements including revision control and record retention.
- The team reviewed Section 3.2 of the NQAM, "Control of Design Interfaces," and Bechtel Engineering Department Project Instruction NOPS-3DP-G04-025, "Design Interface Control," Rev. 1. The procedure defined responsibilities for internal and external organization personnel including communication, documentation, distribution of design control criteria, and interdiscipline coordination. This included control of design input and development, special analysis, and approvals. Requirements were also established regarding the applicability of 10 CFR Part 21 for nuclear safety-related work assigned to an off-project entity (non-Bechtel organization).
- The team reviewed Section 3.3 of the NQAM, "Design Verification," Bechtel procedure NOPS-3DP-G04-00027, "Design Verification," Rev. 1, and Bechtel procedure 3DP-G04-00027, "Design Verification," Rev. 0. These documents described responsibilities and requirements for the verification of design work performed internally by Bechtel. Requirements were defined for the performance and documentation of design verification on structures, systems, and components (SSCs) important to safety for the ESP project. Procedural controls and descriptions existed for design verification either by interdisciplinary design review, independent off-project design review by technical staff personnel, or individual critical design review. NOPS-3DP-G04-00027 modified the design review process documented in 3DP-G04-00027 to require additional documentation for each of the design review methods. Once a verification method was selected, the procedure specified that the verification method was documented with the cognizant chief engineer's concurrence and that deviations were justified and documented. Controls were in place to ensure that the verifier was qualified and not responsible for the design, and all the design review elements applicable to the component were identified. Where design verification is performed by qualification tests, controls were in place to (1) identify the test or tests to be performed; (2) document test configuration(s), operating modes,

and environmental conditions; and (3) consideration of conditions that simulate the most adverse design conditions.

- Design change controls were described in section 3.4 of the NQAM. The procedure specified requirements to control changes to the design of SSCs important to safety after the initial design was complete. Also, the procedure included requirements for review and independent verification of those changes. Controls were in place to review proposed design changes from project engineering, suppliers, field engineering, and others, using the same design control measures applied to the original design. Additional controls were part of procedures NOPS-3DP-G04-00037, "Design Calculations," Rev. 5, and 3DP-G04G-00046, "Engineering Drawings," Rev. 2, which both specify engineering responsibilities and requirements for initial as well as revised or changed documents and drawings affecting the ESP project.
- Section 3.5 of the NQAM, "Computer Programs," prescribed the controls required for the development and use of computer software for quality assurance projects. The procedure delineated the requirements and methodology for software verification and validation, software installation testing, error resolution (corrective actions), and configuration management.

(3) William Lettis and Associates, Inc.

Bechtel subcontracted to WLA to perform various aspects of the work associated with the ESP project. WLA was responsible for reviewing relevant literature and other data pertaining to site and regional tectonic and seismic conditions, including seismic source characterization models previously prepared by the Electric Power Research Institute (EPRI) and others. In addition, WLA performed geologic field reconnaissance activities to develop maps of the site region, developed geologic cross sections for the Vogtle site, reviewed and evaluated existing EPRI seismic source characterization models, and prepared relevant portions of the ESP based on the studies performed. Because WLA did not possess a quality assurance program that met the requirements of 10 CFR Part 50, Appendix B, WLA performed design control work in accordance with Bechtel's quality assurance program.

(4) Risk Engineering, Inc.

Bechtel subcontracted to REI to support Bechtel's ESP efforts in performance of probabilistic seismic hazard and sensitivity analyses for the Vogtle site. REI utilized its QAM and SQAP as guidance in the development of engineering-related documents used for ESP activities. The SQAP is a supplement of the QAM, and included procedures related to the development, verification, validation, and documentation of the software used in quality assurance calculations. A list of the software covered by the SQAP was presented in the scope of the QAM. Software tools, techniques and methodologies, including review of calculations and software tests, were clearly stated by REI. Reference documents, media control, and record collection, as well as organizational responsibilities were detailed in the QAM and SQAP. Quality control procedures were available and documented in Section 2 of the QAM and covered both the QAM and the SQAP. Software specific documents such as Software Requirements,

Software Documents for Design, User's Manual, Verification-Validation (V&V) Plan, and V&V Review Reports were included for each of the software revisions. The SQAP included V&V and Review Report plans to ensure proper documentation of errors and deficiencies as well as any corresponding corrective action.

The team conducted a review of a technical review performed by REI prior to commencing the ESP work. This technical review consisted of the project Software Requirements Description (SRD) and a Verification and Validation Plan (VVP). The team noted that the verification and validation plan contained the testing requirements, test case references, software design description, implementation, review of calculations, and validation of computer program software results, consistent with the QAM and the SQAP.

(5) MACTEC Engineering and Consulting, Inc.

SNC contracted with MACTEC to obtain geotechnical investigations and laboratory testing for the early site permit application. MACTEC utilized the services of four additional suppliers in order to complete the scope of work outlined in the Bechtel specification 25144-000-3PS-CY00-00001, "Technical Specification for Subsurface Investigation and Laboratory Testing for Southern ALWR ESP Project," Rev 1. These suppliers performed work activities associated with surveying, drilling, geologic testing, and laboratory analyses.

After a review of the technical specification mentioned above, the PO that described MACTEC's scope of work, and MACTEC's QAM and project document, the team determined that, although MACTEC provided the necessary measures for design control in its QAPD, MACTEC did not perform design control activities associated with the development of the ESP.

(6) Bay Geophysical, Inc.

SNC procured BGI to perform seismic reflection and refraction mapping for the ESP application. The team reviewed SNC PO No. SN050193, dated December 9, 2005, in which augmented quality requirements were imposed. As stated in the PO, BGI activities were to be witnessed by a qualified SNC representative in accordance with the applicable SNC procedure. Additionally, BGI was required to perform all work in accordance with applicable codes and standards. The team reviewed the final field report provided by BGI, dated March 15, 2006 and SNC QA Surveillance Report No. V-2006-009, dated February 28, 2006 which provided a summary and description of oversight and QA activities performed by SNC.

(7) Savannah River National Laboratory

SNC procured SRNL to perform the soil absorption analysis for the ESP site. The team reviewed the SNC PO with SRNL, No. SN060084, dated March 31, 2006 in which augmented quality requirements were imposed. The augmented quality requirements stated that SRNL shall perform the work in compliance with referenced codes and standards and that SRNL shall have sample tracking and identification controls necessary to assure the integrity of the analysis. The team reviewed the analysis report

from SRNL, WSRC-TR-2006-00246, dated July 18, 2006 and noted in Section 4.0, "References," the codes and standards used for the analysis. Additionally, the team verified that tracking and identification controls for analysis were implemented. The team also reviewed the SRNL certificate of conformance, dated August 30, 2006 which documented that work was performed in conformance with approved codes and standards as specified by the SNC purchase order.

(8) QA Measures for Control of Publically Accessible Internet Data

The team reviewed SNC controls for publically accessible internet data used for the ESP application. Specifically, SNC procedure ND-ARL-003, section 6.7, stated that internet data obtained in support of the application for safety related activities (i.e. calculations, analysis) shall be verified or validated. Additionally, the procedure stated that internet data obtained in support of augmented quality activities be obtained from reliable sources and a dated copy of the data be maintained as a project record. The team reviewed a sample of safety-related and augmented quality internet data contained in the application to verify that the procedural controls required for verification, validation, and record maintenance were followed. Additionally, the team reviewed the SNC ESP SSAR internet references document dated August 31, 2006, that listed the internet sources used in the ESP application.

SNC POs were also reviewed by the team to verify that specific guidance for data input control were specified. For example, SNC PO SN050004/007 for TtNUS required at Section T6601, step 2, that sources of internet data should be obtained from qualified high confidence sources and retained for future review and reference. The team reviewed a sample of internet data referenced and used by TtNUS and verified that the controls were implemented. The team also reviewed additional internet data in the ESP application that included the following.

- U.S. Census Bureau – Cartography Boundary Files, July 18, 2001.
- U.S. Department of Commerce – Regional Economic Accounts, June 24, 2005.
- U.S. Environmental Protection Agency – Geospatial Data Clearinghouse, May 20, 1994.
- Federal Aviation Administration - Augusta, Ga. Regional Airport Information, April 21, 2006.
- U.S. Dept. of Energy - Characteristics of Spent Nuclear Fuel Management, March 18, 2006.

c. Conclusions

The team reviewed POs, the description and methods of work performed, and applicable procedures and engineering documents describing quality assurance design controls for the companies listed above. The team determined that the QA procedures existed for the review of calculations, drawings, specifications, and other design control documents. The team also determined that the procedural controls described by SNC for internet data usage in the ESP application were adequate. Therefore, the team concluded that the QA controls in the design control area were equivalent in substance with the requirements of Appendix B to 10 CFR Part 50 and met the guidance contained in Section 17.1.1. of RS-002.

2.3 Procurement Document Control

a. Inspection Scope

The team reviewed the implementation of quality assurance controls for procurement of services by SNC and its contractors and sub-contractors. The team reviewed purchase orders, work scope technical requirements, project plans, supplier quality assurance programs and methods used by the purchasing organization to qualify suppliers of safety-related services. These reviews were performed to determine if the procurement controls were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002.

b. Observations and Findings

General

SNC selected Bechtel as its principal contractor to assist with preparing the SSAR portion of the ESP application. Bechtel supplied personnel, systems, project management, and resources to work on an integrated team with SNC. Additionally, contractual relationships were established with several specialized consultants to assist in developing the ESP application, as described below.

(1) Bechtel Power Corporation

SNC established work scope and quality requirements for Bechtel in SNC Purchase Order No. SN050006. The PO included a detailed description of Bechtel's work scope, including identification of specific sections of the ESP application, which Bechtel was responsible for performing supporting analyses, evaluations and investigations. SNC specified that materials and services supplied by Bechtel were nuclear safety-related and that Bechtel implement quality controls and a quality assurance program that complied with 10 CFR Part 50, Appendix B. Specifically, those materials and services were required to be provided in accordance with the requirements of the Bechtel NQAM. Additionally, SNC specified that 10 CFR Part 21, "Reporting of Defects and Noncompliance," be applied to the Bechtel PO. The team reviewed the SNC Safety Related Vendor List and verified that Bechtel was listed as an active safety-related vendor and qualified to supply design and engineering services for major projects, including the ESP project.

Bechtel implemented the ESP project quality requirements specified in PO No. SN050006 in the project-specific QAPP. The Bechtel QAPP invoked the quality policies contained in the Bechtel NQAM that were applicable to the ESP project. In accordance with specifications contained in SNC's PO, SNC approved the Bechtel QAPP for use during the Vogtle ESP project.

Bechtel Power Corporation Contracts

(a) William Lettis and Associates, Inc.

The team reviewed the Bechtel Subcontract No. 25144-006-HC4-CY06-00001-0001, "Technical Services Subcontract," dated May 10, 2005. The requisition outlined Bechtel's request for technical services from WLA for the performance of geologic mapping and characterized seismic sources in support of SSAR Section 2.5. Technical services were requested in the form of field and office studies designed to meet Appendix D of Regulatory Guide (RG) 1.165, "Identification and Characterization of Seismic Sources and Determination Safe Shutdown Earthquake Ground Motion," for the identification and characterization of seismic source zones in the region around the Vogtle site. The studies also addressed investigation of the potential for active tectonic deformation at and within the vicinity of the site in accordance with Appendix D of RG 1.165. The document also outlined the applicable codes, standards, and applicable NRC guidance.

Because WLA did not possess a quality assurance program that complied with the requirements of 10 CFR 50 Appendix B, WLA was required to perform the work in accordance with Bechtel's QA program, as described by the Bechtel QAPP, and the implementing procedures for the QAPP contained in Bechtel's PEPM.

Per the Service Requisition, WLA was required to 1) integrate Bechtel's QA program requirements into the subcontractor's work processes before starting work and submit a summary work plan and schedule confirming an understanding of the work; 2) ensure that all WLA personnel performing work undergo QA training by Bechtel; 3) check for proper implementation of the QA requirements as the work progressed; 4) allow access to their facilities and records for QA inspection and audit purposes by Bechtel or SNC; 5) identify and document all deviations from the requirements of the Service Requisition; and 6) identify 10 CFR Part 21 requirements.

(b) Risk Engineering, Inc.

The team reviewed the Bechtel Subcontract No. 25144-006-HC4-HAWC-0001, "Technical Services Subcontract," dated May 10, 2005. The requisition outlined Bechtel's request for technical services from REI for the performance of probabilistic seismic hazard assessments and related sensitivity analyses in support of SSAR Section 2.5. REI was required to provide seismic hazard calculations using original input source models, source parameters and original ground motion relationships as needed to develop EPRI 1989 SSE ground motion values; develop a list of the significant seismic sources from the EPRI 1989 seismic source model; and perform sensitivity analyses based on the earthquake catalog for the most critical sources. In addition, REI was required to develop updated site-specific rock hazard curves, compute seismic hazard curves for free-field ground-surface conditions, and compute the SSE spectrum for the free-field ground surface using seismic hazard curves using a methodology acceptable to the NRC - either that of RG 1.165 or the ASCE methodology (e.g., ASCE/SEI 43-05, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities").

The team reviewed Exhibit D, "Probabilistic Seismic Hazard Assessment and/or Sensitivity Analysis," of Bechtel's contract with REI. The work plan described the scope of work, objectives, and activities to be performed by REI. In addition, the work plan stated that REI was required to perform the work in accordance with its QA program and SQAP. Bechtel specified that 10 CFR Part 21, "Reporting of Defects and Noncompliance," applied to the REI purchase order. REI maintained and implemented a QAM and the SQAP, that were both submitted to Bechtel. The team noted that Bechtel project management and quality assurance personnel reviewed and accepted the REI QAM and SQAP.

(2) MACTEC Engineering and Consulting, Inc.

SNC subcontracted to MACTEC to obtain geological testing support. The scope and specifications for MACTEC activities were documented in Bechtel Technical Specification 25144-000-3PS-CY00-00001, "Technical Specification for Subsurface Investigation and Laboratory Testing for Southern ALWR ESP Project." Section 2.1, "Quality Assurance Plan," of the Technical Specification specified that MACTEC was required to prepare a QA plan that met 10 CFR Part 50, Appendix B requirements and also complied with 10 CFR Part 21 requirements. In addition, MACTEC was required to submit a QA program that conformed to the provisions of ANSI/ASME N45.2-1977. Consistent with the requirements of the Bechtel Technical Specification, MACTEC developed a project specific work plan to identify the scope of work activities and quality requirements, in addition to the MACTEC QAPD. The team reviewed the MACTEC QAPD and the project work plan to assess the adequacy of the specified QA measures, particularly those associated with procurement control, and determined that MACTEC identified a reasonable scope of procurement document control measures to ensure the integrity and reliability of site geological test data.

MACTEC utilized the services of four additional suppliers in order to complete the scope of work outlined in the Bechtel project Technical Specification. These suppliers performed work activities associated with surveying, drilling, geologic testing, and laboratory analyses. Work instructions provided by MACTEC to these subcontractors were reviewed by the MACTEC project principal engineer, the project manager, and a representative from the QA organization. In general, field and laboratory testing activities were conducted in accordance with recognized testing methods from the American Society for Testing and Materials (ASTM) or the Environmental Protection Agency (EPA). The team reviewed the work scope and applied QA measures applicable to each of the four MACTEC subcontractors to verify if MACTEC implemented acceptable procurement document control measures to ensure the accuracy and reliability of ESP data provided by the subcontractors.

(3) Bay Geophysical, Inc.

SNC procured BGI to perform seismic reflection and refraction mapping for the ESP application. The team reviewed SNC Purchase Order No. SN050193, dated December 9, 2005, in which augmented quality requirements were imposed. As stated in the PO, BGI activities were to be witnessed by a qualified SNC representative in accordance with the applicable SNC procedure. Additionally, BGI was required to perform all work in accordance with applicable codes and standards. The team

reviewed the final field report provided by BGI dated March 15, 2006, and SNC QA Surveillance Report No. V-2006-009, dated February 28, 2006, which provided a summary and description of oversight and QA activities performed by SNC.

(4) Savannah River National Laboratory

SNC procured SRNL to perform the soil absorption analysis for the ESP site. The team reviewed the SNC purchase order to SRNL, No. SN060084, dated March 31, 2006, in which augmented quality requirements were imposed. The augmented quality requirements stated that SRNL shall perform work in compliance with referenced codes and standards and that SRNL shall have sample tracking and identification controls necessary to assure the integrity of the analysis. The team reviewed the analysis report from SRNL, WSRC-TR-2006-00246, dated July 18, 2006 and noted in Section 4.0, "References," the codes and standards used for the analysis. Additionally, the team verified that tracking and identification controls for analysis were implemented. The team also reviewed the SRNL certificate of conformance, dated August 30, 2006 which documented that work was performed in conformance with approved codes and standards as specified by the SNC purchase order.

c. Conclusions

The team concluded that procurement activities for ESP activities important to safety were adequately controlled. In particular, SNC and its contractors and subcontractors implemented procurement quality assurance measures that provided reasonable assurance in the integrity and reliability of site data used to support the ESP application. These controls were equivalent in substance with the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002.

2.4 Instructions, Procedures, and Drawings

a. Inspection Scope

For specific organizations with QA/QC responsibilities, the team conducted reviews to verify that SNC and associated contractors developed measures for the control of instructions, procedures, and drawings to ensure the development of the application in a quality manner. To accomplish this inspection, project procedures were reviewed to determine that procedure controls were consistent with the guidance in Section 17.1.1 of RS-002, including provisions for ensuring that ESP activities that could affect SSCs important to safety are prescribed by and accomplished in accordance with instructions, procedures, and drawings.

b. Observations and Findings

(1) Southern Nuclear Operating Company

The SNC NDQAM provided for a system of control for instructions, procedures, and drawings. The NDQAM stated that documented procedures, instructions, and drawings should include appropriate quantitative and qualitative criteria for determining satisfactory work performance and quality compliance must prescribe activities affecting

quality. The team noted that procedures developed specific to ESP and existing QA procedures, where appropriate, were adequately developed and controlled in accordance with their administrative and quality requirements.

(2) Bechtel Power Corporation

The Bechtel NQAM provided for a system of control in which individuals used approved procedures to complete activities affecting quality. SNC contracted with Bechtel to assist with the preparation of the SSAR for the ESP project. The team noted that Bechtel procedures defined the administrative and quality requirements for work performed in support of the ESP project.

(3) William Lettis & Associates, Inc.

Bechtel subcontracted with WLA to perform work for the ESP project. The team noted that WLA performed geologic mapping and characterized seismic sources and followed approved procedures in support the ESP project.

(4) Risk Engineering, Inc.

Bechtel subcontracted with REI to perform probabilistic seismic hazard assessments and related sensitivity analyses. REI provided sensitivity analyses of seismic source parameters and updated ground motion attenuation relationships, developed analysis of safe-shutdown earthquake (SSE) site response effects, and a calculation package to document the results. REI worked with Bechtel to conduct SSE ground motion analyses for the proposed ESP site. All calculations and software used in the development of SSE ground motions were certified for use.

(5) MACTEC Engineering and Consulting, Inc.

The MACTEC QAM stated that qualified, trained individuals were required to use approved procedures to complete activities affecting quality. The team noted that MACTEC developed procedures in accordance with ASTM to complete the laboratory analysis and used approved procedures for the validation of software output calculations.

c. Conclusions

The team verified that SNC and associated contractors followed the guidance in the governing instructions, procedures, and drawings to ensure the development of the application in a quality manner. Therefore, the team concluded that the instruction, procedure, and drawing controls applied to the work performed by SNC and contractors in support of the ESP project were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance contained in Section 17.1.1 of RS-002.

2.5 Document Control

a. Inspection Scope

For specific organizations with QA responsibilities, the team conducted reviews to verify that procedures and instructions for the generation and control of QA documents addressed appropriate attributes of QA document control. To accomplish this inspection, the team conducted reviews to verify that procedures and instructions were reviewed for adequacy, approved for release, and appropriately distributed and used at the location where the prescribed activity was performed. These reviews were performed to determine if the controls were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002. Document control requirements applicable to SNC's subcontractors were also reviewed.

b. Observations and Findings

(1) Southern Nuclear Operating Company

Procedure ND-ARL-002 described SNC's process for control of engineering and licensing documents for ESP activities. This procedure was for use in conjunction with individual SNC processes and procedures. The procedure described the different project documents and how the documents should be processed and tracked. Documents controlled under this procedure were ARL project procedures and records, project correspondence, external project correspondence, project procedures, technical reports, calculations and drawings, internal reports, meeting minutes, and conference notes.

Project procedure ND-ARL-003 described the process SNC imposed on contractors for calculations developed to support ESP activities. Calculations performed in support of the ESP needed to be documented in a Calculation Package and provided to SNC as a QA record (hard copy and electronic copy). The calculation package was required to include, as a minimum, the following, as applicable:

- title and/or subject of calculation;
- date of package;
- source of data/inputs used or method of collection employed;
- copy of data;
- method of calculation or analysis to include software title and version, as appropriate;
- copy of the calculation, analysis, and/or results;
- preparer and date prepared;
- reviewer and date reviewed; and
- approver and date approved.

Purchase orders developed for Bechtel and TtNUS, in support of the ESP project, provided information for the control of calculations. The POs stated that calculations developed for the ESP project must be documented in calculation packages and provided to SNC as a QA record. In addition, each PO required the supplier to provide

a certificate of conformance to the specifications and requirements in the purchase order. The POs also required that, except for the records provided to SNC in accordance to the PO, the supplier must retain all records necessary to verify the validity of supplier certifications in accordance with the supplier's quality assurance requirements.

The PO developed for BGI for the performance of a series of seismic reflection and refraction surveys required that, upon completion of the service, the supplier must provide SNC all documentation described in the BGI proposal as QA records. Documents that must be provided included observer's log, daily system tests, raw uncorrelated field records, processed reflection sections (Sterling), processed refraction sections (Optim), and a brief report on field activities.

The PO developed for MACTEC required that all the documents specified in Bechtel Specification 25144-003-3PS-CY00-00001, Rev. 1, dated June 27, 2005, "Technical Specification for Subsurface Investigation and Laboratory Testing for Southern ALWR ESP Project Burke County Georgia," be submitted to the SNC project manager in accordance with the submittal schedule.

(2) Bechtel Power Corporation

Procedure 25144-00-2KP-K01G-000035, "Process and Control of Engineering Design Calculations," Rev. 0, described the requirements for processing and controlling Bechtel engineering design calculations. The procedure required that the project engineer or designee was responsible for providing the completed, signed, and numbered calculation to administration for processing. The procedure also required the project engineer to enter and track all calculations and their revisions in a calculation register. When calculations were completed, verified and approved, the project engineer was required to submit the calculation to administration for processing. Calculations were processed, controlled, maintained, distributed, and retained in the document management system.

Procedure 25144-000-2K01G-000033, "Bechtel Design, Procurement, and Miscellaneous Documents," Rev. 0, defined the administrative requirements for processing Bechtel documents that required control, distribution and retention. The procedure provided for instructions on the properties and attributes for each document generated, including a document number, title, document class, date, document status, reason for issue, turnover requirement, retention period, and destruction date. The procedure also provided guidance for the documentation of the design verification on Design Verification Reports. The Design Verification Report was required to include as a minimum the method of verification, documents reviewed, summary of review, conclusion and the name and titles of the participants in the design verification.

The team also reviewed the Bechtel's request for technical services from WLA for the performance of geologic mapping and characterized seismic sources in support of SSAR Section 2.5. Because WLA did not possess a quality assurance program that complied with the requirements of 10 CFR 50 Appendix B, WLA was required to perform the work in accordance with Bechtel's QA program, as described by the Bechtel QAPP, and the implementing procedures for the QAPP contained in Bechtel's PEPM.

The team reviewed Exhibit D, "Geological Mapping and Characterization of Seismic Sources," of Bechtel's contract to WLA. The team noted that the work plan outlined the objectives (development of maps of the site and area); activities to be performed (geologic field reconnaissance and related research); methods of investigation (mapping techniques and field reconnaissance); and technical and quality control of the geologic field reconnaissance.

c. Conclusions

The team determined that SNC and contractor procedures addressed the standards for content, control, and quality of QA documents. Therefore, the team concluded that the controls implemented by SNC and contractors for the generation, control, and use of QA documents were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance contained in Section 17.1.1. of RS-002.

2.6 Control of Purchased Material, Equipment, and Services

a. Inspection Scope

The team reviewed documented surveillances and interviewed key project personnel with respect to contractor activities in acquiring data to support the ESP application. These reviews assessed the scope and depth of the applicant's oversight of contractor activities consistent with the importance, complexity, and scope of the contracted services and thoroughness of the surveillances in identifying and resolving deficiencies. The team's review was conducted in sufficient detail to determine if requirements for quality-related activities were equivalent in substance to the requirements of Criterion VII of Appendix B to 10 CFR Part 50 and consistent with the acceptance criteria contained in section 17.1.1 of RS 002.

b. Observations and Findings

The term "surveillance" as used in this section conforms to the definition that a surveillance is a set of observations of limited scope performed by an individual. An audit, by comparison, is generally programmatic in scope, and is performed by a team of qualified auditors. Audits are addressed in section 2.13 of this report. Surveillances of activities performed by Bechtel, MACTEC and their subcontractors Bay Geophysical and Savannah River National Laboratory were reviewed. Bechtel and MACTEC provided safety-related services and, in addition to surveillances, the applicant conducted the necessary audits for placing these vendors on the SNC quality supplier list. Bay Geophysical and Savannah River performed activities in accordance with specified contract requirements. The team's review of surveillance activities is discussed below.

(1) Groundwater Monitoring (QA Surveillance Report No. V-2005-2028)

The surveillance of groundwater monitoring activities was conducted on June 15 and July 16, 2005, in accordance with project procedure 30150-C, "Groundwater Monitoring Program." The data provides a baseline to monitor ground water levels and movement

for the life of the plant. Procedure 30150-C was reviewed in conjunction with the team's review of the surveillance and was found to provide sufficient detail for controlling contractor activities. The surveillance determined the need for incorporating the generic groundwater data sheet into 301040-C and to resolve administrative deficiencies in completing data sheets, omission of intermediary chemistry reviews, the need to record reference well elevations, and to provide locks to control access to the wells. These deficiencies were clearly described, documented in the applicant's corrective action program, and included appropriate action taken to resolve the identified conditions.

(2) Seismic Boring Activities (QA Surveillance No. V-2005-031)

The surveillance of activities associated with seismic boring activities was conducted on September 30, 2005. The scope of the surveillance was limited to equipment calibration and labeling and storage of soil samples. The borings, drilled to obtain representative soil samples and to measure soil resistance to penetration, were conducted in accordance with ASTM D 1586, "Standard Method for Penetration Test and Split-Barrel Sampling of Soil." The work was performed by MACTEC subcontractor GEOVision Geophysical Sciences, using Bechtel Technical Specification 25144-000-3PS-CY00-001, "Subsurface Investigation and Laboratory Testing." The Bechtel procedure was reviewed in conjunction with the team's review of the surveillance and was found to provide sufficient detail for controlling contractor activities. The surveillance identified deficiencies in sample labeling and sample storage, and an inconsistency between the calibration date of the seismic recorder/logger and the calibration data sheet. These deficiencies were clearly described, documented in the applicant's corrective action program, and included appropriate action taken to resolve the identified conditions.

(3) Soil and Water Sampling (QA Surveillance Report No. V-2006-017)

The surveillance of water and soil sampling activities was conducted on April 19, 2006. Field activities were conducted under augmented quality controls as specified in Purchase Requisition 6SNR0607872, AR01-SSAR-XGS-002, and field test procedure 25016-C. Field drilling activities were conducted under supervision of Bechtel project personnel and a MACTEC geologist. Preservation, handling, and transporting of soil samples were conducted in accordance with industry standard ASTM D 4200, "Standard Practice for Preserving and Transporting Soil Samples." The surveillance verified compliance with above cited quality control procedures and the technical guidelines of ASTM D 4220. The surveillance confirmed that chain of custody sheets were completed for each sample and that the MACTEC geologist delivered the samples to MACTEC and Savannah River Site laboratories on the day of sampling. The surveillance identified no deficiencies.

(4) Seismic Reflection/Refraction Survey (QA Surveillance No. V-2006-09)

The surveillance of seismic reflection/refraction survey activities was conducted on February 28, 2006 in accordance with the technical scope of work specified under Bay Geophysical Proposal No. 06-015, dated December 8, 2005. To ensure that activities were conducted in accordance with industry standard practices and procedures, a

principal geologist from the SRNL provided onsite oversight of survey activities. The surveillance documented the conclusions of the principal geologist, who concluded on the basis of his observations that the contractor had satisfactorily performed the technical activities described in its proposal and had taken due care in performing tests and inspections of monitoring instrumentation and in monitoring the quality of the data to ensure that the data was accurate, reliable, and repeatable.

c. Conclusions

The team did not identify any performance-based deficiencies that could have affected the accuracy or completeness of results presented in the ESP application. The surveillance reports reviewed were clearly documented and adequately covered the scope of the surveillances. Deficiencies identified by the surveillances were typical of those routinely found during surveillances of contractor activities and did not significantly affect the quality of the collected data. Each deficiency was clearly described, tracked by the applicant's corrective action system, and resolved. Based on the surveillances performed, as supplemented by audits and on-site supervision, the team concluded that the applicant maintained effective control of quality by contractors and subcontracts and that the surveillances were effective and that activities were performed and controlled in a manner equivalent in substance with the requirements of Appendix B to 10 CFR Part 50, and met the requirements contained in Section 17.1.1 of RS 002.

2.7 Identification and Control of Materials, Parts, and Components

a. Inspection Scope

The team reviewed the implementation of quality assurance measures for the identification and control of materials, parts, and components. Specifically, the team reviewed procedures that described the controls implemented by SNC, contractors, and suppliers to ensure that materials, parts, and components related to ESP activities that would affect SSCs important to safety were adequately identified to preclude the use of incorrect or defective items. These reviews were performed to determine if the controls were equivalent in substance with the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002.

b. Observations and Findings

The SNC NDQAM specified in section 6.8, "Identification and Control of Material, Parts, and Components," that this quality assurance attribute was applicable to vendors and controlled through the purchase order process using approved vendor QA programs and procedures. The team reviewed the quality assurance controls specified in the purchase orders for each vendor listed below to verify that controls were in place, as required for the work performed, for identification and control of materials, parts, and components.

(1) Risk Engineering, Inc.

REI's SQAP described the measures to control the software programs utilized in QA calculations as part of the ESP application. The team noted that section 14 of the SQAP provided for the identification of sequential versions of the software, which included controls to ensure that all versions of software programs used in QA calculations were archived in the software QA file to permit evaluation and review.

(2) MACTEC Engineering and Consulting, Inc.

Section 8 of the MACTEC's QAM described the measures for identification and control of items and samples. The team noted that measures were provided to 1) identify samples to prevent the use of incorrect or defective samples; 2) allow for their proper identification by subsequent users; 3) provide unique physical identification attached to the samples when possible, or in documents traceable to the samples; and 4) maintain chain of custody documentation in the project files.

The team reviewed MACTEC's QAPD to verify the controls associated with the identification and control of materials, parts, and components. The team noted that the QAPD described the measures to control soil samples for use in preparation of the early site permit application, and to identify samples with clear markings and traceability to origin and location at all times, consistent with the QAM.

(3) Other Subcontractors

The team did not identify that Bechtel, WLA, BGI, and SRNL conducted any ESP activities associated with the identification and control of materials, parts, and component. Therefore, the team did not review their controls for this QA attribute.

c. Conclusions

The team reviewed the quality assurance controls for each vendor listed above to verify that controls were in place, as required for the work performed, for the identification and control of materials, parts, and components. The team concluded that the QA controls implemented for the identification and control of materials, parts, and components were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance contained in Section 17.1.1. of RS-002.

2.8 Test Control

a. Inspection Scope

The team reviewed the implementation of quality assurance measures associated with test control. Specifically, the team reviewed procedures that described the controls implemented by SNC, contractors, and suppliers to ensure that testing related to ESP activities that would affect SSCs important to safety were adequately identified and controlled. These reviews were performed to determine if the controls were equivalent

in substance to the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002.

b. Observations and Findings

The SNC NDQAM specified, in Section 6.11, "Test Control," that this quality assurance attribute was applicable to vendors and controlled through the purchase order process using approved vendor programs and procedures. The team reviewed the QA controls specified in the POs for each vendor listed below to verify that controls were in place, as applicable for the work performed, for test control activities.

(1) Bechtel Power Corporation

Bechtel's QAPP established the testing requirements applicable to the SNC ESP project. Bechtel stated in the QAPP that, for test control, quality-related activities associated with the preparation of the ESP application were performed in accordance with Bechtel's NQAM with no additional modifications.

The team reviewed the Bechtel NQAM and procedures describing the requirements and responsibilities for the control of tests. The team noted that Section 11.1, "Testing Requirements," described the control of tests within Bechtel's scope. Specifically, it described the interface responsibilities between Bechtel and the applicant, applicable test requirements and prerequisites, standards and acceptance criteria, including the use of calibrated instruments and suitable test equipment, documentation and evaluation of test results, and handling of test deviations.

(2) William Lettis and Associates, Inc.

Bechtel contracted with WLA to perform various aspects of the work associated with the ESP project. WLA performed geologic field reconnaissance activities to develop maps of the site region, developed geologic cross sections for the Vogtle site, review and evaluation of existing EPRI seismic source characterization models, and prepared relevant portions of the ESP based on the studies performed. Because WLA did not possess a quality assurance program that meets the requirements of 10 CFR Part 50 Appendix B, WLA performed work in accordance with Bechtel's quality assurance program.

The team reviewed two calculation packages developed by WLA for the ESP application. Specifically, the team reviewed SNC calculation number 25144-K-2003, "Recalibration of Radiocarbon Ages and Timing of Charleston Area Paleoliquefaction Episodes for the Updated Charleston Seismic Source (UCSS) Model," dated February 13, 2006; and SNC calculation number 25144-K-2004, "Mean Recurrence Interval for Maximum Magnitude Earthquakes for the Updated Charleston Seismic Source (UCSS) Model", dated February 27, 2006. Both calculation packages contained a description of the test sample input data, identification of the computer operating system and software utilized, assumptions, methodology, discussion of results, and conclusions. The team noted that calculations performed in SNC calculation number 25144-K-2004 were performed on a computer using Microsoft Excel 2002. Input to this calculation consisted of a revised chronology of Charleston seismic source paleoseismic

events and event ages presented by Bechtel in a separate calculation sheet. SNC calculation number 25144-K-2003 included a report that documented the validation of the OxCal 3.10 software and described the validation method utilized to substantiate the program solutions. It was determined that the output data matched the data presented in the study utilized as a benchmark for the calibration of the software. The team also noted that the report was written in accordance with Bechtel procedure 3DP-G04G-00036.

(3) Risk Engineering, Inc.

REI's Quality Assurance Manual, and the SQAP described the overall process for conducting safety-related calculations and established software testing requirements that were applied to the SNC early site permit project. Appendix A to the SQAP described the testing controls implemented by REI to ensure that a particular software used complied to the software design requirements and that it returned the results in a correct and accurate manner. The team noted that the documents used by REI to perform testing on software included a verification and validation (V&V) plan, which described the tasks used to verify and validate the software, and a V&V results report, which documented the results of the software V&V activities. The team also noted that the VVP included provisions for test requirements and prerequisites, test acceptance criteria, documentation and evaluation of test results, and handling of test deviations.

(4) MACTEC Engineering and Consulting, Inc.

Section 11 of the MACTEC's QAM described the measures for controlling tests performed on materials or equipment and verifying test conformance to specified requirements. The team noted that measures were provided to ensure that 1) tests are conducted in accordance with written procedures or instructions; 2) procedures are reviewed and approved by responsible personnel; and 3) test results are documented and reviewed for accuracy and completeness.

MACTEC's QAPD described the measures to control the tests of soil samples for use in preparation of the ESP application. MACTEC stated that there was no acceptance or rejection criteria associated with the testing performed in the soil investigation. MACTEC further stated that the tests were performed using acceptable industry standard methods such as ASTM. The team noted that controls were in place to 1) ensure that testing criteria and requirements were followed; 2) evaluate exceptions to these criteria and requirements; and 3) notify the client for consultation and permission before tests were conducted.

The team also reviewed the NRC Pre-Application Vogtle Site Visit summary report, dated October 18, 2005, in which an NRC staff documented QA observations of MACTEC site boring activities that took place on September 13, 2005. On that date, the NRC staff reviewed various MACTEC field work documents (i.e. field boring logs, work procedures) and also observed several field activities that included site boring operations. The staff concluded in the report that MACTEC activities were controlled by adequate procedures and standards with an appropriate level of supervisory and QA oversight. MACTEC site boring QA activities had also been observed previously by NRC teams at two other pre-application sites and were determined to be adequate.

(5) Other Subcontractors

The team noted that BGI, and SRNL did not conduct any ESP activities associated with test controls. Therefore, the team did not review controls for this QA attribute.

c. Conclusions

The team reviewed the quality assurance measures associated with test control implemented by SNC, contractors, and suppliers. Therefore, the team concluded that the QA controls for testing were equivalent in substance with the requirements of Appendix B to 10 CFR Part 50 and met the guidance contained in Section 17.1.1. of RS-002.

2.9 Control of Measuring and Test Equipment (M&TE)

a. Inspection Scope

The team reviewed the implementation of quality assurance measures associated with the control of M&TE. Specifically, the team reviewed procedures that described the controls implemented by SNC, contractors, and suppliers to ensure that M&TE utilized in ESP activities that would affect SSCs important to safety was adequately controlled. These reviews were performed to determine if the controls were equivalent in substance with the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002.

b. Observations and Findings

The SNC NDQAM specified in Section 6.12, "Control of Measuring and Test Equipment," that this quality assurance attribute was applicable to vendors and controlled through the purchase order process using approved vendor programs and procedures. The team reviewed the quality assurance controls specified in the purchase orders for each vendor listed below to verify that controls were in place, as applicable for the work performed, for control of M&TE.

(1) Bechtel Power Corporation

Bechtel's QAPP, established M&TE requirements applicable to the SNC ESP project. Bechtel stated in the QAPP that the control of M&TE quality-related activities associated with the preparation of the ESP application was performed in accordance with Bechtel's NQAM with no additional modifications.

The team reviewed the Bechtel NQAM and procedures describing the requirements and responsibilities for the control of M&TE. The team noted that section 12.1, "Control of Measuring and Test Equipment," adequately defined the responsibilities for the maintenance, control, calibration, documentation, and identification of tools, gauges, and other M&TE used in activities affecting quality.

(2) MACTEC Engineering and Consulting, Inc.

According to Section 15.2.1 of Technical Specification 25144-000-3PS-CY00-00001, Rev. 1 prepared by Bechtel, the scope of MACTEC's required services include maintaining calibration documentation of field and laboratory equipment. MACTEC's QAPD, Section 2, item 12, "M&TE," invokes additional measures for the control of measuring and test equipment. Specifically, these measures include provisions for evaluating the measurement and test results obtained from equipment that is found to be out of calibration. Such equipment was not to be used until it had been repaired or recalibrated and found acceptable for use. Any results determined to be invalid due to calibration errors were required to have a nonconformance written and processed as specified in the applicable portions of the MACTEC QAPD. M&TE equipment utilized was required to be listed on the test data sheet and meet the criteria as specified in the chosen test method.

The team reviewed a sample of calibration records from MACTEC and three of their subcontractors, GEOVision, Applied Research Associates, and GRL Engineering. The team found that none of the reviewed equipment was out of calibration and all reviewed calibrations were performed within the specified frequency. Examples of equipment for which these records were reviewed include, for example, CME Auto Hammer (Serial No. 219907), Cone Penetrometer Calibration (Serial No. 2437.105), and Pressure Gage (Serial No. 95082-427). Test data sheets were also reviewed to verify that the equipment utilized was identified on the record.

(3) Other Subcontractors

The team did not identify that Bechtel, WLA, BGI, and SRNL conducted any ESP activities associated with the control of M&TE. Therefore, the team did not review their controls for this QA attribute.

c. Conclusions

The team reviewed the quality assurance controls as applicable, for each vendor listed above to verify that controls were in place, as required for the work performed, for the control of M&TE. Therefore, the team concluded that the ESP application QA controls associated with M&TE were equivalent in substance with the requirements of Appendix B to 10 CFR Part 50 and met the guidance contained in Section 17.1.1. of RS-002.

2.10 Handling, Storage, and Shipping

a. Inspection Scope

The team reviewed the implementation of quality assurance measures associated with handling, storage, and shipping. Specifically, the team reviewed procedures implemented by SNC, contractors, and suppliers to ensure that measures were established in administrative processes for classification, packaging, cleaning, preservation, shipping, storage, and handling of materials and equipment. These reviews were performed to determine if the controls were equivalent in substance with

the requirements of Appendix B to 10 CFR Part 50 and met the acceptance criteria contained in Section 17.1.1 of RS-002.

b. Observations and Findings

The SNC NDQAM specified in Section 6.13 "Handling, Storage, and Shipping," that this quality assurance attribute was applicable to vendors and controlled through the purchase order process using approved vendor programs and procedures. The team reviewed the quality assurance controls specified in the purchase orders for each vendor listed below to verify that controls were in place, as applicable for the work performed, for handling, storage, and shipping.

(1) MACTEC Engineering and Consulting, Inc.

Bechtel's Technical Specification 25144-000-3PS-CY00_00001, "Subsurface Investigation and Laboratory Testing for Southern ALWR ESP Project," Rev. 1, described the controls for the handling, shipping, and storage of soil samples. The team noted that MACTEC's QAM, Section 13, "Handling, Storage, and Shipping of Items and Samples," established requirements for assuring that methods are used in the handling, storage, preservation, packaging, and shipping of items or samples.

The MACTEC QAPD provided controls for the handling, storage and shipping of items. It stated that samples are to be identified, traceable to the origin and location, maintained in the chain of custody, and stored in a locked facility with controlled access. The team noted that MACTEC utilized ASTM D 4220, "Standard Practices for Preserving and Transporting Soil Samples," to control and preserve, transport, and handle the samples.

(2) Other Subcontractors

The team did not identify that Bechtel, WLA, REI, BGI, and SRNL conducted any ESP activities associated with handling, storage, and shipping. Therefore, the team did not review their controls for this QA attribute.

c. Conclusions

The team reviewed the quality assurance controls for MACTEC to verify that controls were in place, as required for the work performed, for the classification, packaging, cleaning, preservation, shipping, storage, and handling of materials and equipment. Therefore, the team concluded that materials handling measures supporting the ESP application were equivalent in substance to the measures specified in 10 CFR Part 50, Appendix B and consistent with the guidance on materials handling in Section 17.1.1 of RS-002.

2.11 Corrective Action

a. Inspection Scope

The team reviewed SNC and contractor procedures and instructions covering the identification and correction of the causes of deviations related to site testing and data evaluation, and other ESP activities important to safety. The corrective action programs, and the identified problems, were reviewed for the identification and resolution of generic deviations and documentation of corrective actions. These reviews were performed to determine if requirements for quality-related activities were equivalent in substance to the controls described in Appendix B to 10 CFR Part 50 and consistent with the guidance contained in Section 17.1.1 of RS-002.

b. Observations and Findings

(1) Southern Nuclear Operating Company

The SNC ESP project quality assurance instruction ND-ARL-006 provided for controls on the identification and correction of ESP project conditions adverse to quality. Any conditions adverse to quality pertaining to the actions or functions specific to ESP activities were addressed in accordance with SNC's corrective action program.

SNC implementing procedure NMP-GM-002, "Corrective Action Program," Version 5, required the identification, documentation, and correction of conditions adverse to quality. This procedure was recently revised on August 18, 2006. For inspection purposes, the team used the version effective during the time ESP activities were performed. The procedure version the team used as a reference was dated June 16, 2005.

The procedure required that identified issues be documented in a condition report (CR). Actions that need to be taken associated with a CR were required to be documented in an Action Item (AI) report. Procedure NMP-GM-002 provided for the assignment of a severity level (SL) on a scale from 1 to 5, based on the risk significance and consequence of the condition (SL 1 was the highest risk significance level). The procedure further stated that CRs documenting QA audit findings will be classified as SL 3, CRs documenting QA audit comments will be classified as SL 4 and CRs documenting QA audit recommendations would be classified as SL 5.

The team reviewed all of the CRs and AIs that SNC generated during SNC ESP activities. These included CRs and AIs generated by personnel in the course of ESP activities, surveillances, internal audits and external audits. External audits are addressed separately below. For all of the condition reports, the proposed corrective action and subsequent resolution were found to be adequate to address the identified problem. The team noted that all the CRs were of low risk or had minimal impact on ESP activities. All the CRs were identified as SL 4 or SL 5, since most of them were administrative in nature. Examples of CRs included inaccuracies in the specifications of POs, procedures for data corrections not properly followed, and data sheets not the same revision number as the current procedure. Only two CRs were related directly to ESP activities. These CRs were in the area of handling and storage, where soil

samples were not labeled in accordance with specifications, and samples were not stored with the proper temperature control requirement. The team reviewed the actions taken and the disposition for these CRs. The team noted that the CR documenting the inadequate labeling of samples, did not affect lab testing. All samples contained sufficient information to adequately complete soil testing. For the CR documenting the storage of sample with inadequate temperature control, the team noted that it was determined that the temperature control was not required at the time, due to the time of the year the samples were taken. The CR also documented that the storage area was changed to one that provided for proper temperature control.

The team did note that the majority of the CRs were generated as result of the one audit and two surveillances that were performed during ESP activities. Only a few of the CRs were generated by personnel involved in ESP activities. The team also noted that two CRs were still open at the time of the inspection. However, the team verified that actions to address the CRs were completed. The team discussed these observations with SNC personnel. By the end of the inspection, SNC updated the open CRs to reflect that the corrective actions had been completed and that the CRs were closed. The team determined that the issues identified above did not have a significant impact on ESP activities.

(2) Bechtel Power Corporation

The team reviewed Bechtel procedure 3DP-G04-060, "Processing Corrective Action Reports," Rev. 0. The procedure provided directions for identifying and reporting conditions that adversely affect quality. The procedure also provided guidance for documentation and determination of the root cause of issues, the development and implementation of effective corrective action plans, and the performance of follow-up activities to determine if the corrective action had been effective in resolving the issue. The team determined the guidance in 3DP-G04-060 was adequate for the conduct of a corrective action program.

The team reviewed all the corrective action reports (CARs) that Bechtel generated during SNC ESP activities. The team noted that one CAR had been recently opened and concerned specific ESP SAR sections submitted to SNC for submittal to NRC, without the incorporation of a manager's comments. The team was concerned the comments might affect technical information provided in the ESP application. The team interviewed a Bechtel manager involved in ESP activities on this issue. The manager stated that the comments were not related to technical information and were minor in nature. The manager stated that investigation of all affected sections was conducted in order to verify the incorporation of management comments and that the findings and actions taken out of that investigation would be documented as required by procedure.

(3) Corrective Actions Associated with External Audits

(i) NUPIC Audit of Bechtel Power Corporation

SNC partially relied on a Nuclear Procurement Issues Committee (NUPIC) audit of Bechtel, conducted the week of May 23, 2005. The team reviewed the results of the audit, the three NUPIC findings, and Bechtel's response to the audit findings. The team

reviewed the three findings to determine the potential impact of Bechtel's work on the ESP. The first finding was for several CARs related to the cause determination/description statement that was lacking or incomplete. The NUPIC team noted that each of the CARs was determined to have been adequately resolved prior to completing the audit. The second audit finding was for administrative issues related to checklists used to conduct supplier audits. Most of the finding was administrative in nature (e.g., the audit team leader did not sign the report, "not applicable" checklist attributes were not supported by an evaluation for not being applicable). However, the NUPIC team determined that the audit report contained sufficient evidence to support the audit conclusions. The team determined that the third finding was not relevant to work related to the SNC ESP application (50.59 screenings).

The team reviewed Bechtel's corrective action response to the NUPIC audit in the audit closure memo, dated October 11, 2005. The team noted that NUPIC found Bechtel's responses to the audit findings to be acceptable. The team found that Bechtel's audit responses adequately addressed the findings.

(ii) SNC Limited Scope Audit of MACTEC Engineering and Consulting, Inc.

SNC conducted a limited scope audit of MACTEC during the week of April 24, 2006. Selected elements of MACTEC's quality assurance program and associated implementation were audited. The audit determined that the findings did not have an impact on the work provided by MACTEC. There were five findings in the audit report. The first finding was for a deep down-hole geophysical logging point at the wrong location. The second finding was for inadequate imposition of quality requirements on subsuppliers. The third finding was for an audit with insufficient objective evidence to support the auditor's conclusions. The fourth finding was for a lack of work instructions in the Work Instruction Log. The fifth finding was for MACTEC surveillance personnel not being certified to perform surveillance activities. The team reviewed MACTEC's response to the findings and SNC's Audit Report Closeout memorandum. The team found both documents sufficient in detail to determine adequate corrective action had been taken and that there was no impact on information supplied in the ESP application.

(iii) SNC Limited Scope Audit of Bechtel Power Corporation

During November 28, 2005 through February 1, 2006, SNC conducted a limited scope audit to address issues specific to ESP activities. There were no findings associated with the audit; however, there was one issue associated with subsupplier audits. Bechtel's triennial audit of REI, the primary contractor for the probabilistic seismic hazards analysis in support of the ESP project, had expired. Bechtel documented the issue in CAR No. 72, dated January 13, 2006. Bechtel subsequently conducted a full scope triennial audit for placement of REI on Bechtel's Nuclear Evaluated Supplier's List.

(iv) Bechtel Audit of MACTEC Engineering and Consulting, Inc.

During the week of August 16, 2005, Bechtel conducted an audit of MACTEC. There were two findings as a result of the audit. The first finding noted that there were no written procedures for electronic distribution of MACTEC's quality manual and

implementing procedures, control of procurement documents related to approval and placement into the electronic database, and storage of records in the electronic database. The team found this finding to be administrative in nature and had no impact on the ESP application. The team found MACTEC's response to improve their administrative procedures to be adequate to address the finding.

The second finding was for MACTEC's supplier quality program that allowed approval of suppliers based on historical data and/or third-party accreditation. MACTEC did perform audits for approval of suppliers, but had not revised the quality assurance manual to reflect the change. MACTEC was in the process of revising its quality assurance manual. The team identified no impact on the SNC ESP application. Additionally, all work performed by MACTEC suppliers was done directly under MACTEC's supervision.

c. Conclusions

The team verified that SNC and associated subcontractors followed the guidance in the governing procedures and documents and adequately implemented a corrective action program. Therefore, the team concluded that the procedures and instructions implemented by SNC and contractors for corrective action activities were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance outlined in Section 17.1.1 of RS-002.

2.11.1 10 CFR Part 21 Implementation

a. Inspection Scope

The team reviewed SNC's policies and procedures to ensure an adequate description of the process for implementing 10 CFR Part 21, "Reporting of Defects and Noncompliances." Additionally, the team reviewed SNC's imposition of 10 CFR Part 21 on the subcontractors. These reviews were performed to determine if requirements for quality-related activities were equivalent to the controls described in 10 CFR Part 21.

b. Observations and Findings

(1) *Southern Nuclear Operating Company's Part 21 Controls*

SNC's NDQAM stated in Section 17.1.16, "Corrective Action," that 10 CFR Part 21 shall apply to safety-related activities and services performed by SNC and/or suppliers providing input to the ESP application development. Procedure ND-ARL-001, "Nuclear Development Vogtle Deployment Licensing," Version 1, described the organization functions, responsibilities, and administration of SNC's Nuclear Development, and VDL departments. In Section 6.6, the procedure stated that any individual in the VDL who obtains reasonable information of the potential existence of a condition as described in 10 CFR Part 21 shall immediately notify their supervisor, who will ensure appropriate management personnel are notified as required by company procedures.

Section 8.0 of ND-ARL-001 addressed deviations. The procedure stated that deficiencies identified by the VDL will be reported through the appropriate corrective action system. The VDL will maintain an open item list of identified deficiencies that

have the potential for impacting the ESP/COL or future use of the materials. At the time of the inspection, there were no open deviations requiring evaluations.

Procedure TS-005, "Preparation of 10 CFR 21 Evaluations," Version 5, was reviewed. The procedure was used by SNC personnel to identify and evaluate defects and failures to comply pursuant to 10 CFR Part 21. The procedure was used to assess the reportability of any activity, process, or condition that could be a potential 10 CFR Part 21 when referred to Nuclear Licensing for evaluation by SNC Technical Support personnel or by Supply Chain management.

The team reviewed the NDQAM and procedures for adequacy. No deficiencies were noted. The team reviewed the SNC POs to verify that 10 CFR Part 21 was appropriately imposed. The team reviewed procedure TS-001, "Requisition of Engineering Services," Version 23. The purpose of the procedure was to set forth the process used by SNC technical support personnel when requesting outside engineering/technical contractor services from groups or organization outside of SNC. Bechtel was the only contractor performing work directly for SNC that had 10 CFR Part 21 imposed on them. The other contractors were gathering data and information that was then passed through Bechtel for review.

Augmented quality was defined in procedure TS-001 as engineering/technical services that are nonsafety-related, but 1) because of regulatory or design basis commitment the service is included under the scope of the plant's QAP; or 2) for plant availability reasons, SNC has implemented special controls on the service to help ensure reliability for which there is no regulatory or design basis commitments, but SNC management has determined it is important enough to require the supplier to have a documented quality program, augmented quality should be imposed. Augmented quality requirements were imposed on those suppliers considered technically capable of performing their specific tasks. The PO was tailored with the necessary quality requirements. BGI and SRNL worked under augmented quality requirements imposed through the PO. SNC would be responsible for any potential 10 CFR Part 21 reportability requirements. The team found this process to be acceptable.

The team reviewed SNC's PO No. SN050094 for MACTEC's contract requirements related to Part 21. The staff noted that the PO required MACTEC to have purchaser approval for the disposition of any deviations or nonconformances to the procurement requirements. Based on a review of corrective action reports, the team did not identify any potential 10 CFR Part 21 reporting requirements associated with MACTEC.

(2) Bechtel Power Corporation's Part 21 Controls

Section 16.2 of Bechtel's NQAM outlined the responsibilities for reporting significant deviations and this was further covered in Bechtel Power Corporation Instruction A14-01. The team reviewed instruction A14-01, "Reporting of Defects and Noncompliance to the Nuclear Regulatory Commission (10 CFR 21)." The procedure defined responsibilities, established requirements, and provided guidance for action necessary to implement 10 CFR Part 21. The team also reviewed Bechtel Engineering Department Procedure 3DP-G04-00066, "Reporting Deviations, Defects, and Noncompliance to the NRC," Rev. 1. This procedure provided instruction for the

implementation of Instruction A14-01. Procedure 3DP-G04-00066 defined responsibilities and provided guidance for identifying and evaluating deviations, defects and noncompliance, and reporting. The procedure applied to activities and services performed by Bechtel in the offices and job-sites involving basic components, which included nuclear safety-related design, analysis, inspection, testing, fabrication, replacement parts, or consulting services. The procedure applied to everyone in the supply chain involved in the particular activity. This included subtier suppliers and organizations providing consulting, testing, or inspection services.

The inspectors did make one observation concerning REI's 10 CFR Part 21 evaluation procedure. The procedure lacked sufficient detail to perform an adequate evaluation. The team identified the issue to Bechtel personnel responsible for the oversight of SNC ESP activities. The responsible Bechtel personnel reviewed all of the applicable corrective action reports and determined no potential Part 21 issues existed concerning activities performed by REI. This conclusion was documented in a memorandum to ensure that the review was documented and no potential 10 CFR Part 21 deviations were identified. The team considered Bechtel's response to be acceptable for addressing the observation.

c. Conclusions

The team reviewed SNC's policies and procedures related to the evaluation and reporting of deviations and conducted interviews with cognizant applicant and contractor personnel. Therefore, the team concluded that the policies and procedures that the SNC and major contractor had in place to address 10 CFR Part 21 were adequate.

2.12 Quality Assurance Records

a. Inspection Scope

For specific organizations with QA/QC responsibilities, the team conducted reviews to verify that procedures and instructions for the control and retention of QA records addressed appropriate attributes of QA record control. To accomplish this inspection, project procedures were reviewed to determine if requirements for quality-related activities were equivalent in substance to the controls described in Appendix B to 10 CFR Part 50 and consistent with the guidance contained in Section 17.1.1 of RS-002. Records management requirements applicable to the SNC's prime contractors were also reviewed. Procedures for turnover of contractor documents to the applicant were also reviewed.

b. Observations and Findings

(1) Southern Nuclear Operating Company

Procedure ND-ARL-002, "Advanced Reactor Licensing Records Management," Version 2, stated the policy for the retention of records. Retention duration for Advanced Reactor Licensing (ARL) records classified as QA records was controlled by the Record Type (R-Type) table. When the R-Type was developed or chosen for each document, the retention time was defined. SNC stated that ESP related QA records will be

retained for the life of the plant. Preliminary drafts, as determined by the COL/ESP Project Engineer, not needed for future activities will be purged/discarded within 30 days, following application submittal. Electronic mail (e-mail) that transmitted drafts and comments on the ESP application should be deleted within 30 days following submittal.

Procedure SYNC-6, "Processing and Storage of QA Records Using Syncpower Documentum," describes the method for repository of QA records for SNC. This procedure provided a standard method for using an electronic database, "Syncpower Documentum," (Documentum) for the processing and storage of QA records. Documents that were processed and stored using this procedure included SNC and vendor procedures, drawings, and records.

Procedure TS/CS-008, "Processing of Quality Assurance and Non-Quality Assurance Records," Version 1, established the administrative controls for the receipt, processing, and storage of SNC QA and Non-QA records. This procedure applied to all departments/groups within the SNC corporate offices that performed work under SNC's NDQAPM. This procedure provided for the storage of records in ".pdf" format in the Documentum database to meet long-term storage requirements. The procedure further stated that records stored at SNC's off-site location, which was an approved vault located at Iron Mountain Records Facility in Birmingham, Alabama. Interviews with the document services staff indicated that most of the documents at the off-site facility are stored in the Documentum database and are easily retrievable. SNC's goal is to be able to retrieve all the documents and store them in the Documentum database.

The team reviewed SNC's requirements imposed on contractors for turning over ESP quality records. SNC Project procedure ND-ARL-003, "Advanced Reactor Licensing Quality Criteria Document," Version 1, described that upon submittal of the ESP Application, contractors supporting development of the application will submit to SNC copies of supporting calculations and applicable source and reference documents. Engineering calculations and supporting information developed by SNC will also be collected and retained for the life of the plant.

Procedure TS/CS-008 provided for a Record Control Log (RCL) to track project records transmitted to Document Services (DS) for storage and retention. The team noted that the procedure did not provide a method to track and control records received by contractors before being officially transmitted and processed by DS. Based on the team's observation, SNC stated that they will start using the RCL to track the documents received from contractors and records transmitted to DS for storage and retention.

Procedure TS/CS-008 stated that SNC's Document Service Supervisor (DSS) was responsible for implementing a record program in accordance with applicable regulatory requirements that met the guidance in the NDQAM. Project procedure ND-ARL-002 stated that the Vogtle Deployment (VD) Administrative Assistant was responsible for distribution of project correspondence, transmittal of records related to ARL activities, maintaining the RCL, maintaining project files and verifying that records processed in accordance with this procedure were made available in the Documentum database. Project procedure ND-ARL-002 stated that the Project Manager was responsible for identifying project records that should be retained for permanent storage. The team

noted from discussions that the SNC personnel were aware of specific roles and responsibilities for the proper control of records.

(2) Bechtel Power Corporation

The team reviewed Procedure 25144-000-2K01G-000033. The procedure defined the administrative requirements for processing Bechtel documents that required control, distribution and retention. The procedure stated that the lead individual in the administration functional area for a project, had the overall responsibility for implementation of this procedure. Functional disciplines and group supervisors were responsible for ensuring documents have been submitted to Administration for processing and retention. The team noted that Bechtel personnel adequately controlled records related to the SNC ESP activities in accordance with their administrative requirements.

c. Conclusions

The team verified that SNC and Bechtel adequately implemented a record control program. Therefore, the team concluded that procedures and instructions for the control and retention of QA records implemented by the SNC and contractors were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance outlined in Section 17.1.1 of RS-002.

2.13 Audits

a. Inspection Scope

The team verified that SNC and subcontractors with QA/QC responsibilities had detailed procedures or instructions covering the preparations for and conduct of audits. The team reviewed a sample of completed audits to verify that controls for the performance of audits have been adequately implemented. These reviews were conducted to determine if requirements for quality-related activities were equivalent in substance to the controls described in Appendix B to 10 CFR Part 50 and consistent with the guidance contained in Section 17.1.1 of RS-002.

b. Observations and Findings

The team performed a sample review of audits conducted by SNC and contractors in support of the ESP project. The following audits were reviewed:

- Internal audit of quality activities associated with ESP activities conducted over the period from November 28, 2005 through February 1, 2006.
- External limited scope audit of MACTEC Engineering and Consulting from April 25-28, 2006.
- External audit by NUPIC of Bechtel Power Company, conducted from May 23-27, 2005.

The team reviewed and verified the scope and depth of the audits. The team review of corrective actions associated with the audits discussed below is detailed in Section 2.11 of this inspection report.

(1) SNC QA Internal Audit of ESP Permit Activities

An SNC internal audit of quality related activities associated with the ESP was conducted over the period from November 28, 2005 through February 1, 2006. The purpose of the audit was to verify compliance with applicable requirements of 10 CFR 52, Subpart A; the Support Services QAM; and the ESP QAM as applied to ESP activities. The audit report contained no audit findings, one comment, one recommendation, and one supplier issue. The supplier issue, identified during a limited scope audit of Bechtel, concerned the lack of a full scope audit of Bechtel's subcontractor REI. The supplier issue was determined to have no impact on the quality of services previously provided by Bechtel and REI was placed on SNC's Qualified Suppliers List (QSL) to track through closure.

The evaluation concluded that the performance of ESP activities was satisfactory, and the program was effectively implemented. ESP personnel responsible for performing a given activity were found to be qualified to perform their tasks.

(2) SNC Limited Scope Audit of MACTEC Engineering and Consulting, Inc.

The team reviewed Audit Report No. CQA 2006-078, conducted from April 25-28, 2006. The scope of the limited audit was to evaluate selected elements of the MACTEC's quality assurance program including their implementation in the area of geotechnical subsurface investigations.

MACTEC Engineering and Consulting is an operating unit of MACTEC Incorporated. All MACTEC offices operate under the same QAM. The QA manual is augmented to meet 10 CFR Part 50, Appendix B requirements on a project specific basis by the development of a QAPD. Working procedures provide guidance for the implementation of quality related activities and American Society for Testing and Materials (ASTM) procedures are utilized to perform specific tests in the laboratory and the field.

MACTEC was classified as "Conditional" on SNC's QSL. The QAPD for the ESP work performed under SNC PO SN050094 was reviewed and found to be acceptable. However, MACTEC intended to generate a different QAPD for each nuclear safety related purchase order.

Five deficiencies were identified in the areas of QA records, procurement document control, personnel qualifications, audits, and document control. These findings did not have a negative impact on the safety-related or nonsafety-related equipment and services provided by MACTEC.

MACTEC responded to the findings in a letter sent to SNC, dated June 9, 2006. The letter stated that MACTEC provided objective evidence of corrective actions for four of the five findings. Additionally, the letter stated that objective evidence for the last finding was going to be provided by July 15, 2006. MACTEC sent a letter, dated July 14, 2006,

with the final response to SNC limited scope audit findings. SNC letter, dated July 20, 2006, "Audit Report Closure," documented that MACTEC provided sufficient objective evidence to close AFRs 2006-001 through 2006-005, and closed the audit.

In general, the limited scope audit determined that, with the exception of the identified findings, the audited elements were in compliance with 10 CFR Part 50, Appendix B.

(3) NUPIC Audit of Bechtel Power Corporation

The team reviewed Audit Report No. QAA-05-15, conducted from May 23-27, 2005. The audit of Bechtel was performed to assess the implementation and effectiveness of the Bechtel's NQAP for compliance with the requirements of 10 CFR Part 50, Appendix B. The audit team identified three deficiencies and three observations as a result of the audit. With exception of the three deficiencies identified in design control, procurement document control, and corrective actions, Bechtel's QA program was found to be satisfactorily implemented and to satisfy the requirements of 10 CFR Part 50, Appendix B.

c. Conclusions

The team reviewed the quality assurance measures for each vendor listed above to verify that controls were in place for the conduct of audits. Based on a sample review of completed audits, the team concluded that audits were conducted in accordance with procedures, at an appropriate frequency, by qualified auditors, and were of sufficient scope and depth. In addition, the team concluded that the procedures and instructions for the control audits implemented by SNC and contractors were equivalent in substance to the requirements of Appendix B to 10 CFR Part 50 and met the guidance outlined in Section 17.1.1 of RS-002.

3. **OTHER REVIEW AREAS**

a. Inspection Scope

The following areas, not directly within the scope of Inspection Procedure 35006 but within the scope of Section 17.1.1 of RS-002, were reviewed by the team in support of development of applicable sections of the NRC staff's safety evaluation report.

b. Observations and Findings

The team reviewed the implementation of QA controls related to Inspection, Control of Special Processes, Nonconforming Parts, Materials, and Components, and Inspection, Test, and Operating Status. The team reviewed QA programs, procedures, project plans, and work logs of SNC and its contractors and subcontractors.

(1) Southern Nuclear Operating Company

The team reviewed the quality measures described in SNC's NDQAM, applicable to Inspection, Control of Special Processes, Nonconforming Parts, Materials, and Components, and Inspection, Test, and Operating Status. The team found that

sufficient measures were implemented by SNC in its NDQAM and procedures to provide reasonable assurance that the QA attributes described above were adequately controlled. However, the team did not identify the need for these controls to be applied to the ESP project.

(2) Bechtel Power Corporation

In developing the QAPP, Bechtel determined that certain quality policies contained in the Bechtel Nuclear Quality Assurance Manual were not applicable to the ESP project, including the identification and control of materials, parts, and components; control of special processes; control of status of items; control of nonconformances; significant reportable deficiencies; and construction/site services quality assurance records. Bechtel stated in the QAPP that these activities were not part of Bechtel's scope of work. The team determined that some of these activities, such as control of special processes, control of status of items, and construction/site services quality assurance records were clearly not part of the scope of Bechtel's ESP work. In addition, for the control of nonconformances, the team also found that sufficient measures were implemented by Bechtel to provide reasonable assurance that nonconformances could be identified and corrected. Additional information related to the identification and control of materials, parts, and components can be found in Section 2.7 of this inspection report.

(3) Risk Engineering, Inc.

The team reviewed the quality measures described in REI's Quality Assurance Manual and SQAP applicable to Inspection, Control of Special Processes, Nonconforming Parts, Materials, and Components, and Inspection, Test, and Operating Status. Based on this review, the team did not identify the need for these controls to be applied to REI activities in support of the ESP application.

(3) MACTEC Engineering and Consulting, Inc.

The team reviewed the quality measures described in MACTEC's Quality Assurance Manual applicable to Inspection, Control of Special Processes, Nonconforming Parts, Materials, and Components, and Inspection, Test, and Operating Status. Based on this review, the team found that sufficient measures were implemented by MACTEC QAM and procedures to provide reasonable assurance that the QA attributes described above were adequately controlled. However, the team did not identify the need for these controls to be applied to the ESP project.

c. Conclusions

The team reviewed the QA measures in the areas of Inspection, Control of Special Processes, Nonconforming Parts, Materials, and Components, and Inspection, Test, and Operating Status in support of development of applicable sections of the NRC staff's safety evaluation report. Therefore, the team concluded that, although sufficient measures were included by SNC and contractors, the team did not identify ESP activities requiring the need for these controls to be applied in support of the ESP application.

MANAGEMENT MEETINGS

Exit Meeting Summary

The team presented the inspection results to members of the applicant's management at the conclusion of the inspection on September 1, 2006.

Documents containing proprietary materials were reviewed during the inspection. The team returned these materials to the applicant at the completion of the inspection. The team assured the applicant's management that proprietary information would not be included in the report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant

B. Miller, Senior Vice President
D. Lloyd, Vogtle Deployment Director
C. Pierce, Vogtle Licensing Manager
T. McCallum, COL Project Engineer
J. Davis, ESP Project Engineer
T. Moorer, Environmental Project Engineer
J. Giddens, QA Project Engineer
D. Drinkard, QA
A. Aughtman, Senior Engineer
D. Williams, Adm. Assistant

Bechtel

J. Love, Engineering
T.V. Sarma, QA
J. Prebula, Engineering
M. Clay, Adm. Assistant

Risk Engineering, Inc.

R. McGuire, President (by phone)

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

None.

DOCUMENTS REVIEWED

| NUMBER / TYPE | TITLE | REVISION / DATE |
|-----------------------|---|-------------------|
| NRC Letter | Pre-Application Review of Southern Nuclear Operating Company Early Site Permit Quality Assurance Program | December 2, 2005 |
| NRC Letter | Pre-Application Site Visit to Vogtle Nuclear Plant to Observe Early Site Permit (ESP) Pre-Application Subsurface Investigation Activities (Project No. 737) | October 18, 2005 |
| AR-05-1947 | Southern Company Early Site Permit Quality Assurance Manual | Version 1 |
| | Nuclear Development Quality Assurance Manual | Version 2 |
| | Nuclear Development Quality Assurance Manual | Version 3 |
| Bechtel Job No. 25144 | Quality Assurance Program Plan | Revision 0 |
| Bechtel Job No. 25144 | Project Engineering Procedures Manual | Revision 1 |
| | MACTEC Quality Assurance Project Document | September 2, 2005 |
| | Tetra Tech Quality Assurance Program Manual | Revision 1 |
| ND-ARL-001 | Vogtle Deployment Licensing | Version 1 |
| ND-ARL-002 | Advanced Reactor Licensing Records Management | Version 2 |
| ND-ARL-003 | Advanced Reactor Licensing Quality Criteria Document | Version 1 |
| ND-ARL-006 | Advanced Reactor Licensing Implementing Procedure Reference Document | Version 1 |
| NMP-GM-002 | Corrective Action Program | Version 5 |
| SYNC-6 | Processing and Storage of QA Records Using Syncpower Documentum | |
| TS/CS-008 | Processing of Quality Assurance and Non-Quality Assurance Records | Version 1 |
| TS-001 | Requisition of Engineering Services | Version 23 |

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|--|---|-------------------|
| TS-005 | Preparation of 10 CFR 21 Evaluations | Version 2 |
| | SNC Approved Supplier's List | August 28, 2006 |
| SP-AR-002 | Advanced Reactor Licensing Design Criteria Document | Version 3 |
| ENG-010 | Specifications | Version 3 |
| Bechtel Power Corporation Instruction A14-01 | Reporting of Defects and Noncompliance to the Nuclear Regulatory Commission (10 CFR 21) | May 2000 |
| | Bechtel Nuclear Quality Assurance Manual | Revision 4 |
| QAA-05-015 | NUPIC Audit of Bechtel Power Corporation | May 23, 2005 |
| CQA 2006-078 | SNC Limited Scope Audit of MACTEC Engineering and Consulting, Inc. | April 24, 2006 |
| | SNC Limited Scope Audit of Bechtel power Corporation | February 1, 2006 |
| | Bechtel Power Corporation Audit of MACTEC Engineering and Consulting, Inc. | August 16, 2005 |
| Audit No. C-ESP-2005 | SNC Early Site Permit Project | November 28, 2005 |
| CR-2005100395 | Samples not Labeled in Accordance with Specifications | October 7, 2005 |
| CR-2005100396 | Data Changes Without Initial and Date | October 7, 2005 |
| CR-2005100397 | Sample Jars with Duct Tape Around Seal | October 7, 2005 |
| CR-2005100398 | Sample Storage Locations Without Temperature Control | October 7, 2005 |
| AI-2005201017 | Move Sample to Location with Adequate Protection | October 7, 2005 |
| CR-2005100399 | Data Sheet not the Same Revision as Procedure | October 7, 2005 |
| CR-2005107194 | Data Corrections Without Initial and Date | September 7, 2005 |
| CR-2005106501 | Difficulty Obtaining an Accurate Water Level | August 22, 2005 |
| CR-2005106502 | Ground Water Wells Difficult to Access and Locate | August 22, 2005 |

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|--------------------------|--|--------------------|
| AI-2005203124 | Clean Area Around Ground Water Wells Access | September 20, 2005 |
| CR-2005106504 | Uncontrolled Access to Ground Water Wells | August 22, 2005 |
| CR-2005106533 | Failure to Notify Operating Plant 12 Weeks Prior to Performing Work | August 23, 2005 |
| CR-2006100169 | Failure to Perform Oversight of Certain Supplier Activities | February 20, 2006 |
| AI-2006200401 | Perform Surveillance of Soil Testing | March 22, 2006 |
| CR-2006100170 | PO Requirements not Understood, Accurate, and Appropriate | February 20, 2006 |
| CR-2006100418 | Contractor Listed as Augmented Quality Supplier and PO Requires Quality Program with 18 Criteria | July 11, 2006 |
| CR-2006100223 | ESP Project does not Evaluate for Impact on Plant Activities | January 9, 2006 |
| 25144-00-2KP-K01G-000035 | Process and Control of Engineering Design Calculations | Revision 0 |
| 25144-000-2K01G-000033 | Bechtel Design, Procurement, and Miscellaneous Documents | Revision 0 |
| 3DP-G04-060 | Processing Corrective Action Reports | Revision 0 |
| 3DP-G04-066 | Reporting Deviation, Defects, and Noncompliance to the NRC | Revision 1 |
| CAR-72 | Failure to Establish a New Starting Date for a Triennial Audit Frequency | January 13, 2006 |
| CAR-25144-QSHF-05-001 | Failure to Identify Procedures for Implementation | July 27, 2005 |
| CAR-25144-QSHF-06-002 | Failure to Incorporate Manager's Comments in Certain SAR Sections | August 31, 2006 |
| AIK-T.6 | Documenting Calculations Performed in Support of Client Deliverables | Revision 0 |
| AIK-T.7 | Identifying References in Support of Client Deliverables | Revision 0 |
| AIK-T.1 | Project Files | Revision 2 |
| PO No. SN050006 | SNC PO with Bechtel Power Corp. | January 10, 2005 |

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| PO No. SN050006/002 | SNC PO with Bechtel Power Corp. | April 18, 2005 |
| PO No. SN050193/001 | SNC PO with Bay Geophysical | February 22, 2006 |
| Proposal No. 06-015 | Bay Geophysical Proposal: High Resolution P-Wave Seismic (HRPW) Reflection and Refraction to Map Subsurface Stratigraphy/Pen Branch Fault Delineation | December 8, 2005 |
| Sole Source Justification | Bay Geophysical, Inc. - Provide Seismic Reflection and Refraction Surveys for Early Site Permit Geotechnical Investigation Work at the Vogtle Site January-March, 2006 | December 8, 2005 |
| PO No. SN060084 | SNC PO with Savannah River National Laboratory | March 31, 2006 |
| Spec. No. AR01-SSAR-XGS-0003 | Specification for Early Site Permit Soil Adsorption Distribution Coefficient Analysis | February 20, 2006 |
| Purchase Requisition (PR) No. 5SNR0407308 | SNC Purchase Requisition for Bay Geophysical | December 16, 2005 |
| PR No. 6SNR0607812 | SNC Purchase Requisition for Savannah River National Laboratory | |
| PO No. SN050094 | SNC PO with MACTEC Engineering & Consulting, Inc. | July 8, 2005 |
| Subcontract No. 25144-006-HC4-CY06-00001 | Bechtel Power Corp. Subcontract with William Lettis & Associates, Inc. | May 10, 2005 |
| Subcontract No. 25144-006-HC4-HAWC-00001 | Bechtel Power Corp. Subcontract with Risk Engineering, Inc. | May 10, 2005 |
| Subcontract No. 25144-000-3PS-CY00-00001 | Bechtel Power Corp. Subcontract with MACTEC, "Technical Specification for Subsurface Investigation and Laboratory Testing for Southern ALWR ESP Project." | June 27, 2005 |
| PO No. SN050004 | SNC PO with Tetra Tech | January 11, 2005 |
| PO No. SN0600084 | SNC PO with Savannah River National Laboratory | March 31, 2006 |
| PO No. SN050193 | SNC PO with Bay Geophysical | December 9, 2005 |
| Surveillance Report (SR) No. V-2006-009 | SNC QA Surveillance Report of Bay Geophysical | February 28, 2006 |

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| Certificate of Conformance | SRNL Certificate of Conformance to SNC | August 30, 2006 |
| Field Report | Bay Geophysical Final Field Report to SNC | March 15, 2006 |
| Internet Page (hard copy) | U.S Census Bureau - Cartography Boundary Files | July 18, 2001 |
| Internet Page (hard copy) | U.S. Department of Commerce - Regional Economic Accounts | June 24, 2005 |
| Internet Page (hard copy) | U.S. Environmental Protection Agency - Geospatial Data Clearinghouse | May 20, 1994 |
| Internet Page (hard copy) | Federal Aviation Administration - Augusta, Ga. Regional Airport Information | April 21, 2006 |
| Internet Page (hard copy) | U.S. Department of Energy - Characteristics of Spent Nuclear Fuel Management | March 18, 2006 |
| TS/CS-001 | Procedure Preparation and Control | Version 2 |
| NOPS-3DP-G04-025 | Design Interface Control | Revision 1 |
| NOPS-3DP-G04-00027 | Design Verification | Revision 001 |
| 3DP-G04-00027 | Design Verification | Revision 00 |
| NOPS-3DP-G04G-00036 | Design Calculations | |
| | Risk Engineering Quality Assurance Manual | Revision 6 |
| | Risk Engineering Software Quality Assurance Plan (SQAP) | Revision 5 |
| SNC calculation number 25144-K-2003 | "Recalibration of Radiocarbon Ages and Timing of Charleston Area Paleoliquefaction Episodes for the Updated Charleston Seismic Source (UCSS) Model | February 13, 2006 |
| SNC calculation number 25144-K-2004 | Mean Recurrence Interval for Maximum Magnitude Earthquakes for the Updated Charleston Seismic Source (UCSS) Model | February 27, 2006 |
| Standard Operating Procedure ARA-Q-104 | ARA Cone Penetrometer Standard Operating Procedures | Revision 8 |

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|-------------------------------|---|-------------------|
| | Letter from MACTEC to GRL Engineering, "Instructions for SPT Hammer Energy Calibration." | September 2, 2005 |
| MACTEC procedure 6141-05-0227 | Drilling Deep Boring B-1003 ALWR-ESP Vogtle Project | Revision 1 |
| | Letter from MACTEC to Applied Research Associates, "CPT Pore Pressure Dissipation Tests." | September 1, 2005 |
| GEOVision Report 5492-01 | Vogtle Boring Geophysics | |
| GEOVision procedure | Procedure for OYO P-S Suspension Seismic Velocity Logging | Revision 1.2 |
| GEOVision procedure | Calibration Procedure for GEOVision Seismic Recorder/Logger | Revision 1.2 |
| MACTEC report | Data Report of Geotechnical Investigation and Laboratory Testing, Southern ALWR-ESP Project | February 22, 2006 |
| 25144-001-3DP-G04-00022 | Licensing Documents for SNC Early Site Permit Project | Revision 1 |
| 3DP-G05G-00034 | Quality Indoctrination/Orientation and Training | Revision 2 |
| SDP-G01-00001 | The EDP System | Revision 4 |
| 3DP-G04-00001 | Design Criteria | Revision 001 |
| 25144-006-HC4-CY06-00001-001 | Technical Services Contract between Bechtel and William Lettis & Associates | May 10, 2005 |
| 25144-006-HC4-HAWC-0001 | Technical Services Contract between Bechtel and Risk Engineering | May 10, 2005 |
| 25144-00-2KP-K01G-000035 | Process and Control of Engineering Design Calculations | Revision 0 |
| 25144-000-2K01G-000033 | Bechtel Design, Procurement, and Miscellaneous Documents | Revision 0 |
| AR01-ER-XNC-4401 | Tetra Tech Calculation | January 30, 2006 |

LIST OF ACRONYMS USED

| | |
|--------|---|
| ANSI | American National Standards Institute |
| ARA | Applied Research Associates |
| ARL | Advanced Reactor Licensing |
| ASME | The American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| BGI | Bay Geophysical, Inc. |
| CAR | Corrective Action Request |
| COL | Combined License |
| CR | Condition Report |
| DSS | Document Service Supervisor |
| EPA | Environmental Protection Agency |
| EPRI | Electric Power Research Institute |
| ESP | Early Site Permit |
| GPC | George Power Company |
| MACTEC | MACTEC Engineering and Consulting |
| M&TE | Measuring and Test Equipment |
| ND | Nuclear Development |
| NOAA | National Oceanic and Atmospheric Administration |
| NQA | Nuclear Quality Assurance |
| NQAM | Nuclear Quality Assurance Manual |
| NRC | Nuclear Regulatory Commission |
| NRR | Nuclear Reactor Regulation |
| NUPIC | Nuclear Utility Procurement Issues Committee |
| PE | Project Engineer |
| PEPM | Project Engineering Procedures Manual |
| PM | Project Management |
| PO | Purchase Order |
| QA | Quality Assurance |
| QAM | Quality Assurance Manual |
| QAP | Quality Assurance Program |
| QAPD | Quality Assurance Project Document |
| QAPP | Quality Assurance Program Plan |
| QC | Quality Control |
| REI | Risk Engineering, Inc. |
| RG | Regulatory Guide |
| RS | Review Standard |
| SL | Severity Level |
| SNC | Southern Nuclear Operating Company |
| SRNL | Savannah River National Laboratory |
| SSE | Safe Shutdown Earthquake |
| SQAP | Software Quality Assurance Plan |
| SSAR | Site Safety Analysis Report |
| SSC | Structures, Systems, and Components |
| TtNUS | Tetra Tech NUS, Inc. |
| UCSS | Update Charleston Seismic Source |
| VDL | Vogtle Deployment Licensing |
| VEGP | Vogtle Electric Generating Plant |
| VVP | Verification and Validation Plan |
| V&V | Verification and Validation |
| WLA | William Lettis and Associates, Inc. |