U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NEW REACTORS

Audit Report No:	PROJ0741-2007-001 and PRO0745-2007-001
Organization:	Dominion North Anna COL Application/Entergy Grand Gulf COL Application
Applicant Contacts:	Eugene S. Grecheck Vice President – Nuclear Development Dominion Energy Kenneth Hughey Senior Manager - Business Development Entergy Nuclear Entergy New Plants – Licensing & Quality Assurance
Nuclear Industry:	GE-Hitachi Nuclear Americas LLC (GEH) is the applicant for the design certification of the Economic and Simplified Boiling Water Reactor (ESBWR) and is contracted to support the combined license applications (COLAs) for both North Anna and Grand Gulf. GEH also furnishes engineering services, nuclear replacement parts, and dedication services for commercial grade electrical and mechanical equipment. The Dominion primary contractors for the North Anna COLA development are Bechtel and GEH. The NuStart/Entergy primary contractors for the Grand Gulf COLA development are Enercon and GEH.
Audit Dates:	September 10 through 14, 2007
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Enclosure

AUDIT SUMMARY

The purpose of this audit was to determine if activities were adequately established, documented, and implemented to support the development of the COLAs for North Anna and Grand Gulf.

The audit was conducted at the GEH facility in Wilmington North Carolina. The audit bases were:

- Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR) Appendix B,
- Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," and
- 10 CFR 50.9, "Completeness and accuracy of information."

During the audit, the NRC staff identified two issues associated with implementation of Grand Gulf and North Anna COLA development programs that should be addressed prior to completion of the applications. On September 28, 2007, after the audit, GEH submitted Revision 4 of the ESBWR DCD that generically resolved one issue by adding tracking numbers to COL items. For details, see Section 3.10 of this report. The second issue is described in this report as an audit response request (ARR).

1.0 AUDIT RESPONSE REQUESTS

ARR 3.8-1 is discussed in Section 3.8 of this report.

2.0 STATUS OF PREVIOUS INSPECTIONS OR AUDITS

There were two previous NRC quality assurance (QA) inspections in support of the Grand Gulf and North Anna Early Site Permit (ESP) application development. These NRC QA inspection teams reviewed the ESP applicant and contractor Quality Assurance Manuals (QAMs). The results of these NRC QA inspection teams of ESP activities are provided in the Grand Gulf and North Anna ESP QA inspection reports 052000008/2003001 and 052000009/2004001 (ADAMS Accession Numbers ML040830045 and ML040150170), respectively. At the time of this NRC Grand Gulf and North Anna Pre-COLA QA audit, the NRC had already approved the Grand Gulf ESP application and was still in the process of reviewing the North Anna ESP application.

3.0 AUDIT OBSERVATIONS AND OTHER COMMENTS

3.1 QUALITY ASSURANCE PROGRAMS

a. Audit Scope

The NRC audit team reviewed the QA program requirements and the implementation process for North Anna COLA and Grand Gulf COLA activities. Specifically, the NRC audit team reviewed

the draft completed portions of the North Anna and Grand Gulf COLAs that had been reviewed and accepted by the Dominion and NuStart/Entergy QA programs. The audit team reviewed the following QA documents:

- Dominion Nuclear Facility Quality Assurance Program Description (QAPD), Topical Report DOM-QA-1, Revision 2,
- Bechtel Nuclear Quality Assurance Manual (NQAM), Revision 4, dated April 13, 2004,
- MACTEC Quality Assurance Project Document (QAPD), Geotechnical Services North Anna COL Project No. 6468-06-1472,
- Entergy Quality Assurance Program Manual (QAPM), Revision 16, dated April 11, 2007,
- NuStart Energy Quality Assurance Plan Project Instruction (PI)-009, the Enercon Quality Assurance Manual, Revision 9, dated April 8, 2004,
- MACTEC Procedure for Quality Assurance Project Document (QAPD), Revision 5, dated June 17, 2005, and
- MACTEC Quality Assurance Manual (QAM), MACTEC Engineering and Consulting, Revision 1, dated June 17, 2005.

The audit team also reviewed the GEH Quality Assurance Program (QAP) Description, NEDO-11209-04A, Revision 8, dated March 31, 1989, that governs GEH QAP commitments for both the North Anna and Grand Gulf COLAs. Overall, all of these documents govern the implementation of QA activities performed for the North Anna COLA and Grand Gulf COLA design activities being conducted by Dominion and NuStart/Entergy and its contractors.

b. Observations

At the time of the audit, the North Anna and Grand Gulf COLAs were 75 percent completed and the majority of those sections incorporated the ESBWR design control document (DCD) by reference. Additionally, the staff was able to review implementation of certain aspects of the COLA development process related to site-specific design activities and potential departures from the DCD under evaluation by the applicant.

The NRC audit team reviewed the Dominion, Bechtel, NuStart, Entergy, Enercon, MACTEC and GEH policies and QA programs to assure those policies provided an adequate description of the implementation requirements consistent with the requirements of Criterion I, “Organization,” and Criterion II, “Quality Assurance Program,” of Appendix B to 10 CFR Part 50.

b.1 Quality Assurance Program Descriptions

b.1.1 Dominion Nuclear Facility Quality Assurance Program Description (QAPD) for North Anna COLA

Revision 2 of the Dominion Nuclear Facility QAPD reflects changes to the organization for the operating units (1 & 2) and identifies the initial organization and alignment activities related to

the proposed reference COLA for North Anna Unit 3. The QAPD provides the basis for the control and performance of safety-related and quality-related activities associated with ESP and COLA activities for North Anna Unit 3. Controls, as currently stated in the QAPD, were extended to specific activities associated with the new unit by inserting an applicability statement in the purpose and scope sections of station procedures. These specific QAP controls for the new unit remain in effect until the NRC approves a QA program specific to the new unit, and the associated implementing procedures are in place.

The NRC audit team reviewed the Dominion Nuclear Facility QAPD and verified that the scope of the QA program was consistent with the quality-related activities being performed. The NRC audit team confirmed that the Dominion Nuclear Facility QAPD provided an organizational description, interrelationships, and areas of responsibility and authority for all organizations performing quality-related activities in support of the COLA. The COLA Site Services is responsible for facility project support including project construction and project control.

The Dominion Nuclear Facility QAPD describes the independence between the organization performing auditing or checking functions from the organization performing other QA functions (e.g., design, procurement, etc). Additionally, the COL applicant retains responsibility for the total quality program, with the Dominion quality organization personnel performing oversight activities of subcontracted activities. This includes Nuclear Oversight responsibility for the evaluation of suppliers' quality programs through a system of external audits, evaluations and review of suppler performance in accordance with QA requirements. Dominion also maintained a list of approved suppliers.

b.1.2 Bechtel Quality Assurance Program Plan for North Anna COLA

Dominion contracted with Bechtel as the lead contractor for site characterization activities that will be described in Chapter 2 of the Reference COLA. In addition, Bechtel was responsible for preparing Chapters 1 through 10 of the environmental report.

The Bechtel Quality Assurance Program Plan (QAPP) describes the interface between the Bechtel Nuclear Quality Assurance Manual (NQAM) and GEH specific requirements and commitments that are applicable to the North Anna Unit 3 Reference COLA. The QAPP was based on the NQAM, and in specific cases such as QA program requirements, organization, design control and verification, and QA records, the QAPP simply refers to the NQAM. The QA program policies contained in the NQAM were designed to meet the requirements of Appendix B to 10 CFR Part 50. 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 North Anna COLA project. The QAPP specified the QA policies and requirements applicable to the project, consistent with Bechtel's scope of work. Bechtel implemented modifications to the QA policies as appropriate to reflect unique project or GEH requirements.

The NRC audit team reviewed the Bechtel QAPP and verified that the scope of the QA program was consistent with the quality-related activities being performed. The NRC audit team confirmed that the Bechtel QAPP and NQAM provided an organizational description, interrelationships, and areas of responsibility and authority for all organizations performing quality-related activities in support of the North Anna COLA development.

b.1.3 Entergy Quality Assurance Program Manual for Grand Gulf COLA

The Entergy Quality Assurance Program Manual (QAPM), Revision 16, does not specifically impose QA requirements on the Grand Gulf COLA. QA requirements for COLA development are being imposed through NuStart Project Instruction (PI)-009. NuStart is functioning for Entergy to ensure that the Grand Gulf COLA responsibility was being performed by NuStart during the COLA development.

b.1.4 NuStart Quality Assurance Plan for Grand Gulf COLA

The NRC audit team reviewed the NuStart Quality Assurance Audit Plan, PI-009, and found that NuStart maintains oversight of the Grand Gulf subsequent COLA development assuring proper configuration control and consistency of COL information was maintained with the reference COLA. NuStart was functioning for Entergy, with Entergy staff on the NuStart team, to ensure that the Grand Gulf COLA responsibility was being performed during the COL application development. Quality affected responsibilities were performed by GE and COL application contractors. Section 4 of PI-009 provides the QA criteria NuStart applied for its activities and correlates those to 10 CFR Part 50, Appendix B requirements. NuStart used ASME NQA-1 1994 as a reference in determining acceptable implementation of 10 CFR Part 50, Appendix B, requirements.

As part of the NuStart Energy COLA QA audit plan, PI-009 contains QA plan guidance for meeting the requirements of Criterion I, “Organization,” Criterion II, “Quality Assurance Program,” Criterion III, “Design Control,” Criterion IV, “Procurement Document Control,” Criterion V, “Instruction, Procedures and Drawings,” Criterion XVI, “Corrective Action,” Criterion XVII, “Quality Assurance Records,” and Criterion XVIII, “Audits,” of 10 CFR Part 50, Appendix B.

In PI-009, NuStart either references other (PIs) or stated that the applicable 10 CFR Part 50, Appendix B Criteria was associated with fabrication and construction activities and was beyond the scope of NuStart during the COL application development stage. The team found that 10 CFR Part 50, Appendix B, Criteion VII through XI did not apply to NuStart COLA activities.

Grand Gulf COLA contractor’s will perform work under Criterion VII, “Control of Purchased Material, Equipment and Services,” and Criterion XI, “Test Control,” for site specific design activities, including sampling, testing, data collection, engineering calculations and reports used to determine the physical parameters of the site.

The NuStart COLA Development Project, Project NUSTART-001, Rev 5, used procurement services from several contractors to cover the Grand Gulf COLA FSAR. The primary contractor, Enercon, used several subcontractors but only two of the contractors, MACTEC and Risk Engineering, Inc were performing work in accordance with the requirements of the contractor’s 10 CFR Part 50, Appendix B QA programs.

Enercon performed audits of these sub-contractor QA programs and had accepted these programs. In support of FSAR Section 2.5 of the Grand Gulf COLA FSAR, MACTEC personnel worked under Enercon’s QA program. NUSART-001 identified 6 sub-contractors performing work under the Enercon QAP. NUSTART-001 also identified 13 sub-contractors performing work under the MACTEC QA program. These subcontractors were all trained to either the

Enercon or MACTEC QA programs. The NRC staff did not review MACTEC QA program work already reviewed during the Grand Gulf ESP application QA inspection. For additional details, see NRC inspection report 052000009/2004001.

b.1.5 Enercon Quality Assurance Program for Grand Gulf COLA

The audit team reviewed the Enercon Quality Assurance Program (QAP), Revision 9, dated April 8, 2004. Enercon followed NuStart/Entergy Work Authorization number BREI002, "Work Authorization for NuStrart/Entergy Grand Gulf COL Application Support," and NuStart Combined License Applications Development Project, Project No. NUSTART- 001, Rev 5. Enercon supported development of the Grand Gulf COLA application for FSAR Chapter 8, "Electric Power," Chapter 9, "Auxiliary Systems," and Chapter 17, "Quality Assurance." The work being performed under the contract was subject to QA requirements of Appendix B to 10 CFR Part 50. NuStart through Entergy's QAP provide the necessary training to subcontractor personnel on Enercon's QA Program and the associated Project Planning Document. The contract required that subcontractors shall not employ lower tier subcontractors without prior written QA acceptance and approval by NuStart/Entergy.

b.1.6 MACTEC Quality Assurance Project Documents for North Anna and Grand Gulf COLA

Dominion also contracted directly with MACTEC to perform geotechnical services for the North Anna COLA under MACTEC Quality Assurance Project Document (QAPD), "Geotechnical Services North Anna COL Project No. 6468-06-1472."

The team did review MACTEC QA program work performed under the North Anna COLA development. The general scope and individual subtasks included in the geotechnical site characterization were shown in the "Dominion North Anna COL Project – Scope of Work (SOW) for Subsurface Investigation and Laboratory Testing," issued by Dominion on June 29, 2006. MACTEC was responsible for collecting, analyzing and reporting geotechnical and geophysical data for the preparation of Section 2.5 of the COLA FSAR. The seismic and geotechnical data collection and analysis supporting preparation of FSAR Chapter 2.5 is nuclear safety-related and must be conducted under a nuclear QA program. MACTEC also performed drilling, data collection, and laboratory analysis of data in accordance with the MACTEC QA Program and this QAPD. In conjunction with the geotechnical investigation work associated with the development of Chapter 2.5 of the FSAR, MACTEC also installed several groundwater observations wells for use in determining groundwater levels and conducting in-situ tests.

The audit team reviewed the MACTEC Procedure for Quality Assurance Project Document (QAPD), Revision 5, dated June 17, 2005, and the MACTEC Quality Assurance Manual (QAM), MACTAC Engineering and Consulting, Revision 1, dated June 17, 2005, for Grand Gulf COLA development. This QAM was referenced in the NUSTART-001, along with the MACTEC QAPD that provided the scope of work for data gathering, field sampling, ASTM field tests, laboratory testing, computer software and hardware controls, analysis and report submittals. The MACTEC QAPD order entry procedure section was where the MACTEC Project Manager evaluated QA Training, technical training and qualifications, equipment capability, subcontractor status, and need for readiness review. These QA procedure controls were used to train approximately 13 subcontractors performing safety-related work under the MACTEC QAM for the Grand Gulf COLA application.

b.1.7 GEH Quality Assurance Program (QAP) and Plan for Grand Gulf and North Anna COLA

The GEH QAP for COLA development was based on the standard GE QA Program Description, NEDO-11209-04A, that applies to all GEH activities performed affecting the quality of items and services supplied to nuclear power plants and establishes GEH's compliance with the provisions of Appendix B to 10 CFR Part 50. The most recent revision of NEDO-11209-04A was approved by the NRC staff in March 1989. NEDO-11209-04A commits GEH to the requirements of ANSI/ASME NQA-1-1983 and the NQA-1a-1983 addenda as endorsed by the NRC in Regulatory Guide 1.28, Revision 3 (August 1985).

GE NEDO-33181, "NP-2010 COL Demonstration Project Quality Assurance Plan," Revision 2, dated July 2006, describes the QA program that was used for the control of the design, procurement, manufacture of equipment and components, and services for the North Anna and Grand Gulf COLA development. Consistent with the requirements of the GEH QA program, all managers within NuStart/Entergy, Dominion, and GEH with quality-related responsibilities have full authority to implement their QA programs within their respective areas of responsibility. GEH also established GEH ESBWR project managers with interfacing responsibilities for managing Grand Gulf and North Anna COLA development with NuStart/Entergy and Dominion.

The NRC audit team reviewed NEDO-33181 and verified that the scope of the QA program was consistent with the quality-related activities being performed. GEH must fulfill contractual requirements for North Anna and Grand Gulf COLA development within the scope of the following contracts: DE-FC07-051D14635, "Dominion Nuclear North Anna, LLC," and DE-FC07-051D14636, "NuStart Energy Development, LLC." The scope of quality related activities performed by GEH, and its subcontractors, includes planning, scheduling, engineering and design of the NSSS, turbine island, instrumentation & control, plant civil/structural works, systems, equipment and components, structural design, safety, performance analyses, and cost estimation.

During the review of NEDO-33181, the NRC audit team noted that NEDO-33181 stated that ANSI/ASME NQA-1 would be applied for construction activities only. The NRC audit team questioned NuStart/Entergy, Dominion, and GEH quality organization personnel as to what version of NQA-1 was being used by each. GEH stated that the reference to NQA-1 in NEDO-33181 was a commitment to NQA-1-1983 and NQA-1A-1983 edition. NuStart/Entergy and Dominion QA programs are committed to NQA-1-1994 edition. The NRC has approved industry use of both NQA-1-1994 edition and the NQA-1-1983 and NQA-1a-1983 editions to meet 10 CFR Part 50, Appendix B requirements.

c. Conclusions

The NRC audit team concluded that Dominion, Bechtel, NuStart/Entergy, Enercon, MACTEC and GEH have adequate QA organizations and QA programs and plans that meet the requirements in 10 CFR Part 50, Appendix B for the Grand Gulf and NA COLA development projects.

3.2 DESIGN CONTROL PROCESS

a. Audit Scope

The NRC audit team reviewed the implementation of the Dominion, NuStart, Bechtel, GEH, and Enercon design control processes for the Grand Gulf and North Anna COLAs. Specifically, the NRC audit team reviewed the policies and procedures governing the implementation of the Bechtel, GEH, and Enercon design control processes, and reviewed selected draft and completed portions of the FSARs, some of which have been reviewed and accepted by NuStart and Dominion.

b. Observations

The NRC audit team reviewed the Dominion, NuStart, Bechtel, GEH, and Enercon policies and procedures governing the design processes to assure those guidelines provided an adequate description of the process and implementation consistent with the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50.

b.1 Design Control Policy and Procedures

b.1.1 North Anna COLA

Dominion Nuclear Facility Quality Assurance Program Description states, in part, that the design process controls the selection and independent verification of items and activities consistent with their importance to safety, to ensure that they are suitable for their intended application. The design process includes provisions for performing appropriate reviews by nuclear management, operating and corporate safety review committees, and for required regulatory evaluations.

Dominion Administrative Procedure, AR-NA-400, “Preparation and Processing of the Combined License Application,” Revision 1, dated September 12, 2007, provides guidance to preparers on: (1) author preparation activities, (2) creation of electronic files, (3) preparation of technical content of the COLA, (4) justification of departures from the generic DCD and variances from the ESP, (5) compilation of draft packages for review and approval, and (6) submittal to the NRC.

Dominion Administrative Procedure, AR-NA-400-1001, “COL Application Style Guide,” Revision 1, dated August 21, 2006, provides guidance for the preparation and review of the FSAR portion of the North Anna COLA. The guideline applies to Dominion, GEH and GEH subcontractors, Bechtel and Bechtel subcontractors, and others who have been assigned responsibility for preparing one or more sections of the COLA.

Bechtel EDPI 3DP-G04G-00022, “Licensing Document Review and Approval,” Revision 1, dated April 10, 2007, provides guidance on licensing documents prepared for direct submittal to the appropriate regulatory agencies, as well as those prepared to provide input to clients for their submittal to the regulatory agencies, in support of nuclear plant siting, design, construction, testing, startup, or operation.

Bechtel EDPI 25161-001-3DP-G04G-00023, “Preparation of the Combined License Application,” Revision 0, dated June 14, 2007, stated, in part, that the procedure establishes the process used within Bechtel for preparing information for Dominion’s COLA for North Anna Unit 3. The COLA information will include complete COLA sections, inputs to COLA sections prepared by other organizations, and associated supporting documentation. Section 4, stated, in part, that Bechtel is responsible for submitting to Dominion first draft shells and basis documents prepared to define the scope and outline the expected content for each section. A second draft of a COLA section is prepared by expanding and building upon the first draft.

GEH Quality Assurance Program Description, Section 3.1, stated, in part, that design control practices and procedures include measures to assure that (1) design requirements are defined and design activities are carried out in a planned, controlled, and orderly manner; (2) appropriate quality requirements and standards are specified in design documents; (3) suitable materials, components, and processes are specified in design documentation; (4) appropriate design verification methods are selected and implemented by individuals or group not having direct responsibility to the original design; and (5) design changes are controlled to the same level as was applied to the original design, including review and approval by the same organization that performed the original review and approval unless another responsible organization is designated by GEH management.

GEH NEDC 33350, “COLA Writer’s Guide,” Revision 5, dated August 28, 2007, provided guidance to preparers, reviewers, and administrative staff for development, review, and completion of the various sections of the COLA documents.

b.1.2 Grand Gulf COLA

Enercon QA program stated, in part, that design activities are documented in Project Planning Documents and accomplished in accordance with procedures to assure that applicable design controls are accomplished.

Enercon Project Management Plan NuStart COL Applications Development, Revision 2, dated July 17, 2007, provided guidance and instructions to direct and control the work in development of the NuStart COLAs, and described the process used in the development. These guidelines and instructions were used for the preparation, review, and compilation of the Grand Gulf FSAR.

NuStart Project Procedure G-001, "COL Application First Draft/Annotated Outline Writer's Guide," Revision 4, dated October 25, 2006, provided guidance to preparers on: (1) consistency on development of COL sections; (2) early understanding and identification of additional information inputs for the sections; (3) identifying potential challenges; (4) identifying the disposition of DCD action items; (5) identifying NRC requirements and/or guidance; and (6) documenting the above.

NuStart Project Procedure G-002, "COL Application Preparation Instructions," Revision 6, dated June 29, 2007, provided the guidance to preparers on: (1) consistency for the development of the application; (2) developing additional information inputs; (3) resolving potential challenges; (4) facilitating incorporation of DCD and ESP action item information;(5) assuring compliance with NRC regulations; and (6) documenting the above.

b.2 Implementation of Design Controls

The ESBWR DCD has not been certified by the NRC at the time of the audit. Revision 4 of the ESBWR DCD was scheduled to be submitted to the NRC at the end of September 2007. Both Dominion and NuStart have been working closely with GEH to incorporate as many COL Action Items into Revision 4 of the ESBWR DCD to minimize departures from the DCD.

At the time of the audit, both COL applicants were evaluating two departures from the ESBWR DCD Revision 3: (1) DCD Chapter 2 of Tier 2, Table 2.0-1, "Envelope of ESBWR Standard Plant Site Design Parameters," long term radiation dispersion estimates were lower than the site specific values provided in the North Anna and Grand Gulf ESP and COL applications; and (2) DCD Chapter 13 of Tier 2, numbering scheme cannot be maintained in the North Anna and Grand Gulf FSAR sections. The COL applicants FSAR Chapters 1 and 7 would include tables that document all COL applicant FSAR departures from the GE ESBWR DCD.

The first departure from the ESBWR DCD involves X/Q and D/Q radiation dispersion calculation values for site characterization of dose estimates for routine releases. The Grand Gulf and North Anna COL application FSAR values for routine releases were larger than the same values in GEH ESBWR DCD in Tier 2 Table 2.0-1. Thus, a departure existed between the North Anna and Grand Gulf FSAR and the ESBWR DCD. To partially address this issue, GEH planned to remove the X/Q values from Tier 1 ESBWR DCD Table 5.1-1, "Site Parameters." The GEH X/Q and D/Q values would remain the same in Tier 2 ESBWR DCD Table 2.0-1.

The team found that the Grand Gulf and North Anna COLAs evaluation of these departures from the ESBWR DCD met the requirements in 10 CFR 50.9 for documenting significant health and safety issues for completeness and accuracy. When the COL applicants submit their FSARs to the NRC, the NRC staff will determine if the first COLA FSAR departure from the ESBWR DCD is acceptable.

The NRC audit team also reviewed Entergy Audit Report No. SA07-006, dated August 30, 2007, conducted at the GEH Wilmington facility from July 24-27, 2007. The audit report concluded that implementation of the GEH QA program for the ESBWR projects was considered to be "marginally effective." This included identification of corrective actions concerning GEH procedure changes needed to implement the latest regulatory requirements including design control and analysis activities. For additional details, see section 3.8 of this report.

b.2.1 North Anna COLA

The NRC audit team reviewed the Dominion, Bechtel, and GEH design control processes, and the implementing procedures and policy guidelines governing the Dominion, Bechtel, and GEH design processes applied to the North Anna project. The NRC audit team verified that the guidance was consistent with the requirements for design control described in Criterion III of Appendix B to 10 CFR Part 50. The NRC audit team verified that the Bechtel and GEH procedures were being used in the development of draft FSAR sections, as required. Based on discussions with the Dominion Licensing Manager, the NRC team learned that Dominion invokes, in step 5.2.3 of AR-NA-400, NuStart procedure G-002 as part of its acceptance review of GEH FSAR sections that were common to North Anna and Grand Gulf. The NRC audit team verified that once a FSAR section was completed, proper reviews were performed by Dominion to accept the FSAR section.

The NRC audit team reviewed selected packages associated with completed FSAR sections developed by Bechtel that were accepted by Dominion. The NRC audit team also reviewed completed FSAR sections developed by GEH that were common to both North Anna and Grand Gulf. These FSAR sections were also reviewed and accepted by both Dominion and NuStart.

(1) Bechtel COL Sections

The NRC audit team reviewed the packages associated with FSAR Section 8.2, “Offsite Power System,” FSAR Section 2.4.11, “Low Water Considerations,” and FSAR Section 9.2.1, “Plant Service Water System.” These sections were applicable to North Anna only. FSAR Section 2.4.11 contained COL Action Item 2.0-22-A9 that was addressed in ESP SSAR 2.4.11 and incorporated by reference in the North Anna COLA. The NRC audit team verified that the packages contained the documentation to support Dominion review and approval. FSAR Sections 2.4.11 and 9.2.1 had open items that needed to be addressed by either Bechtel or GEH prior to the issuance of the COLA to the NRC. Tracking of the open items was consistent with the Dominion and Bechtel procedures. The NRC audit team did not identify any deficiencies in this area.

(2) GEH COL Sections

The NRC audit team reviewed the thirteen completed FSAR sections that were common to North Anna and Grand Gulf COLAs. All of the sections incorporated the ESBWR DCD by reference. However, some of the sections originally contained COL Action Items that have been incorporated into Revision 3 of the ESBWR DCD. The NRC audit team verified that the packages contained the documentation to support the Dominion and NuStart review and approval process. The NRC audit team did not identify any deficiencies in this area.

b.2.2 Grand Gulf COLA

The NRC audit team reviewed the Enercon's design control process, and the implementing procedures and policy guidelines governing the Enercon's design process applied to the Grand Gulf project. The NRC audit team verified that the guidance was consistent with the requirements for design control described in Criterion III of Appendix B to 10 CFR Part 50. The NRC audit team verified that both G-001 and G-002 were being used in the development of draft FSAR sections, as required. The NRC audit team verified that proper internal and external reviews were being performed on the draft FSAR sections developed by Enercon.

The NRC audit team reviewed selected packages associated with draft FSAR sections that were in various stages of development and review. The NRC audit team review packages associated with FSAR Sections 17.1-17.3, “Quality Assurance,” FSAR Section 2.4.4, “Potential Dam Failures,” and FSAR Appendix 8A, “Miscellaneous Electrical Systems.” Draft FSAR Section 17.1 included the standard wording developed by GEH, but also included additional information regarding (1) quality assurance implemented during early site permit activities, (2) NuStart contracting with Enercon on behalf of Grand Gulf, and (3) the current operating quality assurance plan for Grand Gulf being implemented until the QA program description provided in draft FSAR Section 17.5 is implemented.

The NRC audit team verified that design control requirements had been appropriately implemented consistent with the procedures for the development of FSAR sections. The NRC audit team did not find any deficiency in this area.

c. Conclusions

The NRC audit team concluded that the applicant's design control process requirements have been appropriately translated into implementing procedures and implemented as required by the applicants' and their contractors' procedures to support the North Anna and Grand Gulf COLA development programs. The NRC audit team did not identify any other issues in this area requiring additional action by the applicant prior to completion of the COLAs.

3.3 PROCUREMENT DOCUMENT CONTROL

a. Audit Scope

The NRC audit team reviewed the QA program commitments and the implementation of the controls for procurement of items and services by Dominion, Entergy, and primary contractor GEH and its contractors and sub-contractors for ESBWR COLA activities. Specifically, The NRC audit team reviewed project procedural controls for assuring that applicable regulatory requirements, design bases, and other requirements that were necessary to assure adequate quality were suitably included or referenced in procurement documents. The scope of the evaluation included review of corporate procurement procedures, specific requirements of contractor quality assurance programs, purchase orders, quality vendor lists, quality and technical requirements, and other related documents.

b. Observations

b.1 Policies and Procedures for Procurement Document Control

The NRC audit team reviewed Dominion's procedural controls for assuring that applicable regulatory requirements, design bases, and other requirements that were necessary to assure adequate quality were suitably included or referenced in procurement documents. Controlling documents include corporate procedures DNAP-1802, Revision 2, "Quality Assurance Program Elements for Supply Chain Management," VPAP-0401, Revision 13, "Material, Equipment, or Services Needs Identification," VPAP-0404, Revision 6, "Procurement Interfaces," and applicable sections of the Dominion Quality Assurance Program Description, DOM-QA-1, Revision 2. Section 4 of the Dominion QA program references the corporate procedures and meets the QA standards for NQA-1-1994, Basic Requirement 4, "Procurement Document Control," and Supplement 4S-1, "Supplementary Requirements for Procurement Document Control."

The NRC audit team reviewed the NuStart Energy Quality Assurance Plan, PI-009, Revision 12, provisions for procurement control. Consistent with this plan, NuStart representatives shall prepare and review procurement documents to include or reference applicable regulatory requirements, design bases, regulatory bases, and other requirements that were necessary to assure adequate quality. To the extent necessary, procurement documents required contracts or subcontractors to provide a quality assurance program consistent with the pertinent provisions of 10 CFR Part 50, Appendix B.

b.2 North Anna COLA

The NRC audit team reviewed the purchase order authorizing Bechtel to coordinate the tasks associated with preparation of the North Anna COLA and integrating an ESBWR unit with existing site facilities. All work performed under the contract was to be implemented in accordance with Dominion's quality control and assurance program that complies with the requirements of 10 CFR Part 50, Appendix B, and NQA-1-1994, or equivalent NRC-endorsed standard (e.g., ANSI N45.2). Additionally, the Dominion QA program required the supplier to impose, as appropriate, flow-down quality requirements on subcontractors and sub-suppliers.

The Bechtel contract with MACTEC Engineering and Consulting, Inc. (PO #70157983, June 29, 2006) classifies the order as safety and imposes 10 CFR Part 50, Appendix B, NQA-1-1994, and 10 CFR Part 21 reporting requirements. It also imposed flow-down quality assurance and 10 CFR Part 21 requirements on sub-suppliers and sub-contractors. The NRC audit team reviewed Dominion safety related vendor documentation and supplier qualification audits for the principal suppliers (GE-Hitachi, Wilmington, North Carolina, and Bechtel Power Corporation) and found that they adequately documented the basis for qualifying these suppliers for the contracted work.

b.3 Grand Gulf COLA

The NRC audit team reviewed the documents that comprised the contractual agreement between the parties preparing the Grand Gulf COLA.

NuStart Energy Development, of which Entergy Operations, Inc. is a member, signed a Site and Development Agreement, effective December 1, 2006, under which NuStart would provide all services with respect to the development of a COLA through issuance of the COL. A related Access Agreement among NuStart, Enercon Services, Inc., Entergy Operations, Inc., and the Site Owner was signed on April 13, 2006, whereby the Site Owner (Grand Gulf) expressed a willingness to be the subject of a COLA.

NuStart Energy Development entered into a Cooperative Agreement with GEH, effective May 4, 2005. Entergy and Enercon signed a Cooperative Agreement, effective May 4, 2005, Site and Development Agreement, effective April 13, 2006. The team confirmed that the principal suppliers, GEH, Wilmington, North Carolina and Enercon Services, Tulsa, were on Entergy's Qualified Supplier List as providers of safety-related engineering services.

b.3 MACTEC Purchase Order

The Enercon purchase order to MACTEC associated with contract activities for the preparation of the Grand Gulf COLA was authorized on February 1, 2006. Under the contract, MACTEC was charged to collect and analyze geotechnical and geophysical data as part of preparing section 2.5 of the FSAR. MACTEC was responsible for performing all drilling, data collection, and laboratory analysis of data in accordance with its QAP. The NRC audit team verified that MACTEC was maintained on Enercon's Qualified Vendors List and had been qualified as an approved supplier on January 11, 2006 on the basis of an audit conducted from December 4 through 16, 2005.

MACTEC was contracted to perform field activities associated with exploration and geotechnical data collection. This included the furnishing of drill rigs and specialized equipment; drilling operations; the collection, logging, and handling of samples; lab analyses; geophysical surveys; and support documentation. Under the contract, Enercon provided the geologist that oversaw drill rig operations and that performed logging of associated activities. The contract deliverable was a report, including certified boring logs and lab analyses with supporting technical documentation. Contractual quality requirements invoked 10 CFR Part 50 Appendix B, 10 CFR Part 21, and NRC regulatory guides associated with COL site and laboratory investigations. Task authorizations, modifying the technical scope of the contract to drill additional holes and provide for continuous water sampling were also reviewed.

b.4 William Lettis & Associates (WLA) Purchase Order

The Enercon purchase order to WLA associated with contract activities for the preparation of the Grand Gulf COLA was authorized on January 1, 2006. Standard contract provisions for this Professional Services Agreement were provided, with quality requirements identified per Exhibit A of the agreement, "Quality Assurance Requirements." Under the general provisions of the contract, WLA was charged with performing activities at the owner's site under the approved MACTEC QA program. All other QA activities were conducted in accordance with the Enercon QA program. MACTEC personnel, working closely with WLA, generated a report and drafts of section 2.5 of the FSAR, whose backup analysis and calculations were prepared in accordance with the Enercon QA program. WLA activities at the owner's site were performed under the MACTEC QA program. All other activities were performed under the Enercon QA program. Applicable QA requirements were invoked through procurement documents on sub-tier suppliers and contractors.

Task authorizations associated with the work were reviewed. Authorization was given for coordination of work activities associated with field exploration and geotechnical data; subsequent authorization was given for field changes, primarily transfer of work scope between WLA and MACTEC personnel; separate authorization was given for technical coordination of specialty contractors, MACTEC, University of Texas, and REI, who were charged with performing the probabilistic seismic hazard analysis and developing the design ground motion in compliance with regulatory requirements.

b.5 Subcontractors for Geological Technical Data

Specialty work performed by subcontractors at the owner's site was conducted in accordance with "MACTEC Master Subcontract Agreement with Subcontractors," dated February 8, 2004. The attached agreement imposed the requirement that work be performed in accordance with the applicable portions of the owner's QA program and the MACTEC QA program. Specific, applicable requirements were specified for calibration of measurement and test equipment, software validation, personnel training and qualification, corrective actions, and documentation of work. Conformance to technical requirements specified by contract, witnessing of work, right of inspection, acceptance of work by MACTEC, and corrective actions in response to MACTEC identified deficiencies were included as contract requirements.

c. Conclusions

The NRC audit team concluded that the procurement document control process requirements were appropriately translated into implementing procedures and, for those activities reviewed by the audit team, implemented as required by the applicant's and/or its sub-supplier's procedures to support the Grand Gulf and North Anna COLA development programs. The NRC audit team did not identify any issues in this area requiring additional action by the applicants prior to completion of the COLA.

3.4 DOCUMENT CONTROL

a. Audit Scope

The NRC audit team reviewed the implementation of the NuStart, Dominion, Entergy, Bechtel, GEH, and Enercon processes of document control for the Grand Gulf and North Anna COLA programs. Specifically, the NRC audit team reviewed policies and procedures governing their document control processes to verify the overall extent and effectiveness of their programs. The NRC audit team verified that the quality-related documents were developed, reviewed, approved, issued, used, and revised under an established program.

b. Observations

b.1 Policies and Procedures for Document Control

Dominion's QA program stated, in part, that the company has established and implements administrative controls to assure the review, approval, and issuance of controlled documents and changes thereto. Dominion's Station Administrative Procedure, VPAP-0601, "Document Distribution and Control," established the method and responsibilities for the distribution and utilization of controlled documents. Dominion's Station Administrative Procedure, VPAP-1701, "Records Management," established the methods, responsibilities and requirements for the creation, collection, storage, maintenance, and disposition of documents and records generated during the operation, maintenance and support of the North Anna and Surry Power Stations. Dominion's Administrative Procedure, AD-AA-101, "Preparation and Processing of Procedures and Guidance and Reference Documents," established the controls for the preparation and processing of Nuclear Fleet procedures and Guidance and Reference Documents (GARDs). Entergy's QA program stated, in part, that a program is established and implemented to control the development, review, approval, issue, use and revision of documents.

Bechtel's Policy No. Q-6.1, "Policy, Manual, and Procedure Control," identified the responsibility for the preparation, approval, issuance, and control of quality program policies, manuals, and procedures.

Enercon's QA program stated, in part, that document control covers review for adequacy and issuance of documents, the revision and disposition of superseded documents, and required notification of affected organizations.

NuStart Project Instruction, PI-009, "Quality Assurance Plan," described activities for implementing quality assurance oversight as assigned to the QA Task Lead (QA LEAD). NuStart Project Instruction, PI-007, "Records Management Plan," defined how the NuStart Electronic Records Management System (ERMS) will be utilized to support the NuStart project.

NuStart Project Instruction, PI-008, “Document Control Practices,” provided guidance regarding the control, use and distribution of information created or obtained in connection with the NuStart project. NuStart Project Procedure G-001 provided guidance to preparers on: (1) consistency on development of COL sections, (2) early understanding and identification of additional information inputs for the sections, (3) identifying potential challenges, (4) identifying the disposition of DCD action items, (5) identifying NRC requirements and/or guidance and (6) documenting the above.

NuStart Project Procedure G-002 provided the guidance to preparers on (1) consistency for the development of the application; (2) developing additional information inputs, (3) resolving potential challenges, (4) facilitating incorporation of DCD and ESP action item information, (5) assuring compliance with NRC regulations, and (6) documenting the above.

GEH QAPD, NEDO-11209-04A stated, in part, that procedures and practices were established, documented, and implemented to control the issuance and use of documents that prescribe activities affecting quality. These measures provided assurance that documents, including changes, were reviewed for adequacy and approved for release by authorized personnel and were properly distributed for use at the location where the prescribed activity was performed. GEH Policy and Procedures Procedure, Policy 100-1, “General Electric Hitachi Nuclear Energy Americas (GHNEA) Policies and Procedures,” established the requirements and responsibilities for the control and administration of policies and procedures for GHNEA. GEH Policy and Procedures Procedure, Procedure 100-11, “Control and Administration of GHNEA Policies and Procedures,” defined the requirements and responsibilities for the control and administration of GHNEA Policies and Procedures.

b.2 Implementation of Document Control Programs

The NRC audit team reviewed the samples used for verification of design control to verify that documents had been reviewed, approved, issued, and revised consistent with procedures.

The NRC audit team noted that Enercon’s implementing procedures for document control were embedded into its respective project planning documents, (PPDs) via a standardized format used for each separate project.

The NRC audit team noted that Entergy’s QA program requirements for document control and quality records were being satisfied under the NuStart QA program. Entergy would apply its document control and quality records QAP requirements after the COLA project was completed.

The NRC audit team noted that during a review of NuStart procedures, PI-007, “Records Management Plan,” and PI-008, “Document Control Practices,” several inconsistencies related to document retention, processing of quality records from suppliers, and procedures to address maintenance, storage, and control of records. Subsequent review discovered these items were recently identified and documented during a vendor audit conducted by TVA Nuclear, Nuclear Assurance Vendor Audit Services on August 28-30, 2007, audit/survey number 2007V-17. These deficiencies were entered into TVA’s corrective action program under deviation report 2007V-17-01 and captured in NuStart’s corrective action program as corrective action report CAR-07-010. NuStart was in the process of evaluating and implementing corrective actions to address these deficiencies.

The NRC audit team noted that the development of the COLA for Grand Gulf was done in different stages with different revision numbers for each stage, where Revision A was the first draft of the individual sections of the COLA. Revision B was issued after the second draft resolution of all internal and external comments on each of the sections. Revision C was then issued when the COLA sections were combined at a chapter level. Revision D to the COLA was issued at the chapter level after external comment resolution. Revision 0 represented the final COLA that would be submitted to NRC for review.

The NRC audit team noted that the development of the COLA for North Anna was also done in different stages. Once the 'second draft' was developed, subsequent revisions were uniquely identified by revision date. Revision 0 was the final COLA ready to be submitted to NRC for review.

The NRC audit team noted the following different electronic systems used by Bechtel, Dominion, Enercon, Entergy, GEH, and Nustart for document control:

- Bechtel utilizes the records management system InfoWorks
- Dominion utilizes an electronic database management system (EDMS) called WebTop.
- Enercon Utilizes Enterprise Informatics (eB) Configuration Management platform, for NuStart ESBWR COLA and EDMS for internal reviews.
- Entergy utilizes NuStart's document management system for all QA records associated with COLA. All pertinent documents will be subsequently transferred from NuStart to Entergy at the completion and issuance of the COL.
- GEH utilizes the electronic document control system e-Matrix to store, revise, track and distribute all quality records associated with COLA and/or DCD preparation.
- NuStart utilizes Enterprise Informatics (eB) Configuration Management platform.

The NRC audit team observed and verified adequate use of computerized systems to maintain proper identification, adequacy, and completeness of controlled documents. The NRC audit team also verified that the electronic systems provided adequate interface between COLA sections.

c. <u>Conclusions</u>

The NRC audit team concluded that the document control process requirements were appropriately translated into implementing procedures and, for those activities reviewed by the audit team, implemented as required by the applicants' and its contractor's procedures to support the Grand Gulf and North Anna COLA development programs. The NRC audit team did not identify any issues in this area requiring additional action by the applicant prior to completion of the COLA.

3.5 CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

a. Audit Scope

The NRC audit team reviewed the implementation of the Dominion, Entergy, NuStart, GEH, Bechtel, and Enercon processes for controlling purchased material, equipment and services for the North Anna and Grand Gulf COLA programs. Specifically, the NRC audit team reviewed the policies and procedures governing the process to verify the quality of suppliers providing engineering services for North Anna and Grand Gulf COLAs design activities.

b. Observations

The NRC audit team reviewed the Dominion, Entergy, NuStart, GEH, Bechtel, and Enercon policies governing control of design engineering services and activities for the North Anna and Grand Gulf COLAs. These documents governed the implementation of quality activities performed for North Anna and Grand Gulf COLA design activities by Dominion, Entergy, NuStart, GEH, Bechtel, and Enercon.

b.1 Policies and Procedures for Control of Purchased Material, Equipment and Services

b.1.1 North Anna COLA

Dominion Nuclear Facility Quality Assurance Program Description, TR DOM-QA-1, Revision 2, states, in part, that the Nuclear Oversight, Nuclear Analysis and Fuel, and Supply Chain Management use a systematic approach through audits, independent inspections, surveillances, or tests to verify Supplier quality.

Dominion Administrative Procedure, AR-NA-400, “Preparation and Processing of the Combined License Application,” Revision 1, dated September 12, 2007, states, in part, that application sections prepared by project organizations other than Dominion are prepared in accordance with the other organization’s quality process and submitted to Dominion for acceptance.

Bechtel Nuclear Quality Assurance Manual, Revision 4, dated April 13, 2004, provides the requirements for evaluating and selecting subcontractors and for controlling the quality of their work.

Bechtel Engineering Department Procedure Instruction (EDPI) 3DP-G06G-00009, “Supplier Document Submittal Requirements and Document Review Process,” Revision 5, dated March 9, 2007, establishes the process for specifying supplier engineering and quality verification documents requirements and to provide guidelines for the technical review of these documents.

GEH Quality Assurance Program Description, NEDO-11209-04A, Revision 8, dated March 31, 1989, states, in part, that procedures and practices are established and documented to provide assurance that purchased items and services conform to the procurement document requirements. Measures include provisions for source evaluation and selection, review of procurement requirements, QA or engineering review of supplier documents, appropriate objective evidence of quality furnished by the supplier, surveillance, inspection or audit at the source, and examination or review of items or services upon delivery or completion.

GEH Policies and Procedures 70-14, "Nuclear Energy Quality Assurance Audit Requirements," dated February 6, 2007, provides the requirements and processes for a comprehensive audit program for all internal and supplier quality assurance audits conducted by or for GEH. GEH provides engineering services to both North Anna and Grand Gulf COLAs.

b.1.2 Grand Gulf COLA

Entergy Quality Assurance Program Manual (QAPM) states, in part, that the program includes provisions for ensuring that documented evidence of an item's conformance to procurement requirements is available at the site before the item is placed in service or used unless otherwise specified in procedures.

NuStart Project Procedure G-002, Revision 6, "COL Application Preparation Instructions," provides the guidance to preparers on (1) consistency for the development of the application; (2) developing additional information inputs, (3) resolving potential challenges, (4) facilitating incorporation of DCD and ESP action item information, (5) assure compliance with NRC regulations, and (6) documenting the above.

NuStart Project Instruction PI-014, Revision 1, "NuStart COLA Review," provides guidance for performing reviews of Grand Gulf COLA content and related documents.

Enercon's QA program states, in part, that for services procured by Enercon, acceptance would be accomplished by the review of documents produced, and may require verification of conformance to specifications by surveillance or audit of the activity.

b.2 Review of Activities

The NRC audit team reviewed the above programs and implementing procedures governing the Dominion, Entergy, NuStart, GEH, Bechtel, and Enercon control of purchased engineering services for the North Anna and Grand Gulf COLA programs. The NRC audit team verified that the guidance was consistent with the requirements for control of purchased material, equipment and services as described in Criterion VII of Appendix B to 10 CFR Part 50. As part of the implementation review, the NRC audit team verified that Dominion and NuStart had included appropriate level of quality requirements in the purchase orders, in addition to the quality requirements needed for sub-suppliers. The NRC audit team did not identify any deficiency in this area.

b.2.1 North Anna COLA

The NRC audit team also reviewed the implementing procedures developed by Dominion for the review and approval of COLA documents. As stated in AR-NA-400, application sections prepared by project organizations other than Dominion were to be prepared in accordance with the other organization's quality process and submitted to Dominion for acceptance. Dominion Program Description AR-NA-10, "Combined License Project – Project Execution Plan," Revision 2, dated February 5, 2007, provided the project plan for North Anna Unit 3, dividing each step of the project plan into tasks. Task 3 was the combined license application that included the preparation and submittal of the COLA, and support for the NRC review including the hearing. The NRC audit team reviewed the integrated project schedule developed for Task 3. As discussed with the Dominion Licensing Manager, the project schedule provides the steps necessary for Dominion review and acceptance of COLA sections prepared by GEH and

Bechtel. These steps include review of 1st draft (shell), GEH or Bechtel response to request for information, review of the 2nd draft, comment resolution, and final verification and signoff of a COLA section. The NRC audit team reviewed two COLA Sections prepared for acceptance by Dominion from GEH and Bechtel.

(1) GEH COL Sections

The NRC audit team reviewed the packages associated with FSAR Chapter 10, "Steam and Power Conversion System," Sections 10.1, "Summary Description," and 10.3, "Turbine Main Steam System." These sections were common to North Anna and Grand Gulf COLAs. Both sections incorporated the ESBWR DCD by reference. However, both sections originally contained COL Action Items that have been incorporated into Revision 3 of the ESBWR DCD. The NRC audit team verified that the packages contained the documentation to support Dominion review and approval as described in the Task 3 integrated schedule. The NRC audit team did not identify any deficiencies in this area.

(2) Bechtel COL Sections

The NRC audit team reviewed the package associated with FSAR Section 1.12, "Impact of Construction Activities on North Anna Units 1 and 2," and FSAR Section 2.4.9, "Channel Diversions." These sections were applicable to North Anna only. FSAR Section 2.4.9 contained COL Action Item 2.4.9 that was addressed in ESP SSAR 2.4.9 and incorporated by reference in the North Anna COLA. The NRC audit team verified that the packages contained the documentation to support Dominion's review and approval as described in the Task 3 integrated schedule. Both FSAR sections were accepted by Dominion for use in the North Anna COLA. The NRC audit team did not identify any deficiencies in this area.

The NRC audit team reviewed GEH's and Bechtel's control of purchased materials, equipments and services process, policy guidelines, and implementing procedures applied to the North Anna COLA project. Bechtel did not sub-contract services for the development of the North Anna COLA sections. The NRC audit team did not identify any deficiencies in this area.

b.2.2 Grand Gulf COLA

The NRC audit team also reviewed the implementing procedures developed by NuStart for the review and approval of Grand Gulf COLA documents. As stated in PI-014, NuStart's project managers use the electronic system (eB) during the different stages of the development of the Grand Gulf COLA for review and comment. All comments were entered on a comment resolution form for Enercon's review and disposition. In addition, the PI-014 provided for additional review and approval by proper management when the final package was sent by Enercon. The NRC audit team did not identify any deficiency in NuStart's control of purchased material, equipment, and services for the activities completed at the time of the audit.

The NRC audit team reviewed Enercon's control of purchased materials, equipments and services process, policy guidelines, and implementing procedures applied to the Grand Gulf COLA project. For the development of the Grand Gulf COLA, Enercon sub-contracted services for site-specific activities, including site characterization tests and calculations. Enercon used

implementing procedure G-002 to document the verification and acceptance of purchased services. The acceptance of contracted services was to be documented when the final package was sent to each applicant/client. In addition, the NRC audit team found that based on the nature of the services procured and the design control process applied by Enercon for the development of the Grand Gulf COLA, any unacceptable services would be captured during the process of the development of the application.

The NRC audit team reviewed other quality records such as the Approved Vendor List information, Audit Reports, supplier responses to audit findings, and Enercon Corrective Action Request forms related to audit findings. The NRC audit team did not identify any deficiency in this area.

c. Conclusions

The NRC audit team concluded that the control of material, equipment, and services process requirements, including the oversight of suppliers, were appropriately translated into implementing procedures and, for those activities reviewed by the audit team, implemented as required by the applicants' and its contractor's procedures to support the NA and Grand Gulf COLA development programs. The NRC audit team did not identify any issues in this area requiring additional action by the applicant prior to completion of the COLAs.

3.6 CORRECTIVE ACTIONS

a. Audit Scope

The NRC audit team reviewed the GEH corrective action process associated with the preparation of the Grand Gulf and North Anna COLAs. Specifically, the NRC audit team reviewed the policies and controlling procedures associated with the projects, and reviewed the status of all corrective actions, which were predominately identified through the audits and surveillances described in the Project Plans for the COLA projects.

b. Observations

b.1 Policies and Procedures for Corrective Actions

GEH Engineering Operating Procedure, EOP 75-3.00 specifies the responsibilities for actions to promptly identify, record and correct, as appropriate, conditions adverse to quality (CAQs) and to assure that these conditions do not affect the quality of a product or service.

Bechtel's Policy No. Q-16.1, "Corrective Action Program," defines the responsibilities of Engineering, Construction, Procurement and Quality Assurance Services for assuring that an adequate corrective action program was provided and implemented. Bechtel's Policy No. Q-16.2, "Significant Reportable Deficiencies," outlines responsibilities for reporting significant breakdowns in any portion of the QAP as described in 10 CFR 50.55(e).

Documentation of corrective action(s) were required to include: (1) description of the identified deficiency with applicable priority level; (2) cause analysis; (3) immediate actions taken to correct the deficiency; and (4) recurrence control, if applicable. Upon verification that immediate actions and applicable recurrence controls had been completed, the Corrective Action Report

(CAR) may be closed out. The report and any associated documents will be retained in the project files as a Quality Record.

Enercon corporate procedure CSP 16.0 prescribed controls to ensure correction of conditions adverse to quality for safety-related items or services within Enercon or at a subcontractor facility. Responsibility for determining the significance of a condition or event, initiation of actions to correct adverse conditions, and determination of recurrence controls were the responsibility of the QA Manager. Verification of the adequacy and completion of corrective actions were the responsibility of the QA Manager, the project QA Engineer, and the Lead Auditor responsible for a particular audit.

b.2 Corrective Action Status

The NRC audit team reviewed the latest GEH corrective action status report for COLA related CARs, dated September 7, 2007. Several electronic files for completed and in-process corrective actions were reviewed. None of the corrective actions reviewed were determined to be significant or 10 CFR Part 21 reportable. The CARs adequately documented the issues; corrective actions were determined to appropriately address the identified conditions and closure and verification were adequately documented. As of the date of the audit, all open CARs were in various stages of closure. Based on a review of the status report and documented description of the adverse conditions, the NRC audit team concluded that the proposed actions to correct the issues were adequate.

The NRC audit team reviewed the latest Bechtel corrective action status for COLA related CARs. A total of three CARs were reviewed. None of the corrective action reports identified deficiencies as significant or reportable as required by 10 CFR Part 21. The NRC audit team determined that these CARs were appropriately prioritized with sufficient detail to adequately document the issues. The corrective actions appropriately addressed the identified conditions with closure verification adequately documented. As of the date of the audit, two of three Bechtel CARs had been completed and closed out. The remaining corrective action was initiated on August 15, 2007, and documented an adverse trend in procedure adherence associated with the Bechtel Geotechnical and Hydraulic Engineering Services department. The NRC audit team concluded that the proposed corrective actions were adequate.

The NRC audit team reviewed Entergy Audit Report No. SA07-006, dated August 30, 2007. The audit report concluded that implementation of the GEH QA Program for the ESBWR projects was considered to be marginally effective. This audit report identified corrective actions that the COL applicants and GEH need to implement before submitting the COLAs to the NRC. For additional details, see Section 3.8 of this report.

c. Conclusions

The NRC audit team concluded, except for the one issue identified above, that the requirements for corrective actions were properly translated into implementing procedures and, for those activities reviewed by the audit team, implemented as required by the applicant's and/or its sub-supplier's procedures to support the Grand Gulf and North Anna COLA development programs. The NRC audit team did not identify any other issues requiring additional action by the applicants prior to completion of the COLAs.

3.7 QUALITY ASSURANCE RECORDS

a. Audit Scope

The NRC audit team reviewed QA program record controls to verify that the QA program provided for the preparation of sufficient records to furnish documentary evidence of activities affecting quality. Specifically, the NRC audit team verified that the QA program provided for the administration, identification, receipt, storage, preservation, safekeeping, retrieval, and disposition of all records. Also, the audit team verified that the procedures and policies were developed to adequately implement the requirements for record retention.

b. Observations

b.1 Policies and Procedures for Quality Assurance Records

Bechtel's Policy No. Q-17.1, "Office Records Retention/Turnover," defines the requirements for controlling and maintaining office quality records and turnover of such records to the client. Bechtel's Frederick Execution Unit (FREU) administrative procedure, FAP 2KP-K01G-00039-003, "Quality Records," described the administrative requirements for processing quality records in compliance with NQA-1, Supplement 17S, "Supplementary Requirements for Quality Assurance Records," in accordance with Bechtel's Nuclear Quality Assurance Program.

Dominion's Station Administrative Procedure, VPAP-1701, "Records Management," established the methods, responsibilities and requirements for the creation, collection, storage, maintenance, and disposition of documents and records generated during the operation, maintenance, and support of the North Anna and Surry Power Stations.

NuStart's QAM, NuStart-001, and, on behalf of NuStart, Duke Energy's QAM, Duke Energy-010, contained information regarding QA records. Specifically, Section 4.17, Criterion XVII, "Quality Assurance Records" of NuStart-001 and Duke Energy-010, stated that sufficient records, such as corrective action documentation, reports of reviews, audits, assessments, qualifications of personnel, and procedures will be maintained to furnish evidence of activities affecting quality.

Enercon's Quality Assurance Manual, Revision 9, contained information about quality record control in Section 17.0. This section prescribed requirements for QA records that furnish documentary evidence regarding the quality of safety related items, or the performance of activities affecting the quality of such items.

Enercon's Corporate Standard Procedure (CSP) 17.03, Revision 1, "Quality Assurance Records," of Enercon's "Corporate Quality Assurance Program Manual" prescribed the activities required for the collection, storage, and maintenance of QA records associated with the design, manufacture, construction, and operational phase activities of nuclear power plants. It provided generic record retention requirements between Enercon and its clients. In addition to the generic requirements given in CSP 17.03, specific record retention requirements were provided in the "Project Planning Document and Project Instructions" for both NuStart and Entergy.

GEH Engineering Operating Procedure, EOP 75-6.00, "Quality Assurance Records," defined the system for creation, identification, control, transmittal, retrieval, and retention of records to

satisfy legal, contractual, regulatory, and industry standards requirements for substantiation of the quality of GEH products and services.

GEH Policy and Procedures Procedure, Procedure 70-50, “Handling and Storage of Quality Assurance Records,” defined the requirements for the collection, storage, and maintenance of QA records by organizations responsible for records within GEH.

GEH Policy and Procedures Procedure, Procedure 100-17, “Records Storage,” defined the requirements within GEH for the storage of inactive and vital records.

b.2 Review of Quality Assurance Records

The NRC audit team reviewed a sample of QA records including the review and approval histories of Enercon, Bechtel, GEH, Dominion, and NuStart to verify that the procedures related to QA record control were being adequately implemented. The sample included records for COLA Section 10.1, DRF No. 0000-0070-0287, “Engineering Operating Procedures,” EOP 42-1.00, “Design Process, Administrative Records,” AR-NA-400, “Preparation and Processing of the COLA,” AR-NA-501, “Transmittal of Technical Information,” AR-NA-300, “Quality Assurance, NuStart Project Instructions,” and Enercon's and Dominion’s Training Records. The NRC audit team also spoke with the GEH Quality Assurance Manager and Bechtel’s Project QA Manager to discuss their process for collection, storage, and maintenance of quality assurance records.

The NRC audit team reviewed a sample of records for NuStart to verify that the procedures related to quality assurance record control were being adequately implemented. The NRC audit team noted that NuStart draft revision ‘A’ of PI-015, “Change Control for COLA Information,” shown as ‘released’ in its electronic document management system, eB, was contrary to the guidance provided in NuStart procedure PI-008, “Document Control Practices,” in that this revision of PI-015 was not yet released for use. CAR 07-014 was generated to document this issue. The audit team also noted that the NuStart Project Instructions Procedures did not have signatures of approval and/or effective dates. This observation was also noted during the QA audit conducted by the NRC for Lee and Bellefonte COLA. Subsequent investigation revealed this condition was originally identified by TVA during a vendor audit it had conducted of NuStart in July 2007. The NRC audit team verified that the procedures had been adequately reviewed and approved using an electronic database; however, the electronic process did not provide objective evidence of the approvals. These issues and others were placed in the NuStart corrective action program as CAR-07-005, dated July 26, 2007. A copy of CAR-07-005 evaluation and subsequent corrective actions were reviewed by the NRC audit team. Both the evaluation and pending corrective actions appeared to be adequate to correct the noted deficiencies.

c. Conclusions

The NRC audit team concluded that the QA record control requirements were appropriately translated into implementing procedures and, for those activities reviewed by the NRC audit team, implemented as required by the applicant’s and/or its sub-supplier’s procedures to support the Grand Gulf and North Anna COLA development program. The NRC audit team did not identify any issues requiring additional action by the applicant prior to completion of the Grand Gulf and North Anna COLAs.

3.8 AUDITS

a. Audit Scope

The NRC audit team reviewed a representative sample of audits conducted by the applicants and their contractors to determine the effectiveness of the audit process and timely completion of audits. Findings identified during the applicants and contractor audits were reviewed by the NRC team for any adverse significance they may have had on the development of the COLA. Corrective actions to resolve deficiencies identified by the findings and observations were reviewed for reasonableness and timely resolution.

Audits of the Enercon and Bechtel quality assurance programs by the Nuclear Procurement Issues Committee (NUPIC) were applicable to both the Grand Gulf and North Anna COLAs. Further, GEH COL project personnel and activities were being conducted under the same GEH QA program and were closely aligned with the development of the ESBWR DC application. Finally, activities related to site characterization were contracted by both COLAs to MACTEC and WLA.

b. Observations

b.1 Policies and Procedures for Audits

Section 18.0 of the Enercon QA Program, described the Enercon audit program for determining the effectiveness of the QA program and for audits of subcontractors to assure compliance with applicable regulations codes, standards, and subcontractor QA programs. Section 18.0 also described the requirements for qualifications of auditors, qualification and certification of Lead Auditors, audit planning and performance, and audit reporting, notifications and closeout.

Section Q-18.1 of the Bechtel QA Program established the policy for the conduct of audits to assure that quality program commitments were being implemented effectively. The policy applied to audits performed by Bechtel personnel, subcontractors, and design consultants. Section Q-7.6 of the Bechtel QA Program defined the requirements for evaluating and selecting subcontractors (including consultants/design subcontractors) and for controlling the quality of their work.

For the North Anna and Grand Gulf COLA development projects, project plans were used to summarize and translate client procurement requirements into policies, procedures, and controlling documents to implement a program that satisfied the requirements for safety-related activities. The Enercon and Bechtel project plans specified the applicable corporate standards, and procedures, and industry and regulatory documents that govern activities to be conducted in accordance with Appendix B to 10 CFR Part 50.

b.2 North Anna COLA

Dominion contracted with Bechtel Power Corporation to coordinate the tasks associated with preparation of the COLA and integrating an ESBWR unit with existing site facilities.

The NRC audit team reviewed a Dominion audit report documenting an audit of the design and engineering services associated with the COLA at Bechtel's Frederick facilities in August 2007. The limited scope audit encompassed Bechtel's QA Program and QA Project Plan as applied to

the design and engineering services associated with the North Anna COLA. The Dominion audit included review of supporting implementing procedures, evaluation of documentation of completed activities, and interviews with Project personnel. One Dominion audit finding, related to control of software, was determined not to be significant in that the deficiency was isolated and would not have had an adverse effect on safety or operability had it remained uncorrected. The Dominion audit concluded that Bechtel had effectively implemented its quality controls and meet applicable regulatory requirements in its activities associated with North Anna COLA development. The NRC audit team also reviewed NUPIC Audit Report No. 19211, conducted in May 2005 that served as the basis for Dominion's approval of Bechtel as a supplier of nuclear safety related items and services.

MACTEC Engineering & Consulting Services was an approved Dominion supplier of nuclear safety related services related to concrete, grout, and soil testing. The NRC audit team reviewed a Dominion audit conducted at the MACTEC Raleigh, NC facility in June 2006 for the purpose of evaluating its quality program for geotechnical service, subsurface investigation and laboratory testing associated with the North Anna COLA. The Dominion audit concluded that MACTEC was effectively implementing a QAP meeting applicable regulatory requirements of 10 CFR Part 50, Appendix B, and 10 CFR Part 21 for the contracted services. The NRC audit team also reviewed a Dominion audit report, conducted at the North Anna site in November 2006. The North Anna site audit concluded that the site subsurface activities were conducted in accordance with the Dominion QA program, and applicable standards and procedures. Dominion audit findings that the Project Plan and implementing procedures should address provisions for review and concurrence of quality-related procedures, and verification of quality through audits and supplier surveillances were subsequently implemented.

Risk Engineering, Inc, was an approved Bechtel supplier of nuclear safety related computational and expert consulting services to support Bechtel's COLA in performance of probabilistic seismic hazard and/or sensitivity analyses. The NRC audit team reviewed a triennial supplier qualification audit of REI, conducted by Bechtel in January 2006. Based on the results of the Bechtel audit and subsequent closure of findings related to computer software, document and design change control, Bechtel approved REI as a supplier for these services.

b.3 Grand Gulf COLA

Enercon Services, Inc., entered into an agreement with NuStart for development of the Grand Gulf COLA. NuStart, NUPIC, and Duke, on behalf of NuStart, conducted several audits and surveillances associated with Enercon consulting, technical, and engineering services during the term of the contract. The NRC audit team reviewed several of these oversight activities conducted during the period of the contract.

A NUPIC team conducted an audit of the Enercon QAP during March 2006 at the Kennesaw, GA and Mt. Arlington, NJ offices. The NUPIC team found that Enercon's program was in compliance with Appendix B to 10 CFR Part 50, but recommended that a source surveillance and/or documentation review be conducted specific to the probable maximum flood determination. In April 2007, Duke, on behalf of Nustart, conducted the recommended surveillance and documentation review at the Enercon Oklahoma office, which was assigned responsibilities for hydrological and meteorological data collection and analysis. Duke found that the Enercon programs were in compliance with 10 CFR Part 50, Appendix B and 10 CFR Part 21.

A NuStart audit of the implementation of Enercon corporate and project controls was conducted at the Enercon Mt. Arlington, New Jersey office from October 24 through 27, 2006. Although the Grand Gulf COLA project was assigned to Enercon's Kennesaw, Georgia office, programmatic deficiencies common to the NuStart Grand Gulf COLA were identified and resolved.
In June 2007, a Duke surveillance, on behalf of NuStart, was conducted at the Enercon Mt. Arlington, New Jersey office. The Duke surveillance focused on controls for site characterization activities. Several administrative deficiencies were identified and subsequently resolved. The NRC observed site characterization activities conducted for the Grand Gulf site on June 19 and 20, 2006. The observations included COL pre-application subsurface investigation activities being conducted to obtain geotechnical/seismic data to support the Grand Gulf COLA. The NRC inspectors observed locations to be drilled within the site characterization boundaries, visited several boring sites, examined site records, and observed WLA, MACTEC, and MACTEC contractors conducting site activities. The NRC site visit report (ADAMS Accession Number ML062060034) concluded that all drilling and field testing activities observed were being controlled with adequate procedures and standards, and with an appropriate level of supervisory and quality assurance oversight.

b.4 Nustart/Entergy Quality Assurance Audit of GEH

GEH provides services associated with preparation of both the Grand Gulf and North Anna COLAs. The NRC audit team reviewed Entergy Audit Report No. SA07-006, dated August 30, 2007, conducted at the GEH Wilmington facility from July 24 through 27, 2007. The audit included auditors from NuStart members Entergy and Duke Power, and a Dominion auditor for the North Anna COLA project. The audit report concluded that implementation of the GEH QA Program for the ESBWR projects was considered "marginally effective". Due to the status of the COLA preparation process when the audit was performed, follow-up to further assess certain topics will be performed by NuStart when completed work products were available. The Entergy audit report indicated that the GEH ESBWR Nuclear Plant Project should address ten corrective action requests (CARs) to the satisfaction of the Entergy, Dominion, and NuStart QA organizations. As a result of this limited scope Entergy audit, which specifically evaluated the design control process, six findings and four recommendations were issued for programmatic deficiencies. Corrective actions to resolve these deficiencies had not been implemented at the time of the NRC audit.

Four of the Entergy audit findings were the result of GEH not incorporating current regulatory requirements into its design control processes (LO-CAR 2007-00077, LO-CAR 2007-00078, LO-CAR 2007-00079, LO-CAR 2007-00082). One Entergy audit recommendation (LO-CAR 2007-00083), discussed procedure changes for convening the GEH expert panel to review the DC applicant and COL applicants list of risk significant SSCs within the scope of the Design Reliability Assurance Program (D-RAP). In January 2008, the GEH expert panel plans to meet to finalize the list of risk-significant SSCs within the scope of D-RAP. The NRC staff had already identified this expert panel issue as an open item in the ESBWR design certification application review.

The NRC audit team determined that GEH and the COLA applicants should address these Entergy audit findings, with a fuller description of the corrective actions taken to resolve these audit findings, and any adverse impact on the completeness and accuracy of the COLAs before submitting the COLAs to the NRC. As a result of this NRC audit, the COL applicants were requested to provide a description of the corrective actions taken to resolve these findings in the

GEH QA program in the context of the COL application. This issue is identified as audit response request (ARR) 3.8-1.

The NRC audit team also reviewed an audit conducted on behalf of NuStart by Duke Power (NuStart Audit No. GE05-01), conducted in August 2005 that assessed the GEH QAP and its implementation for compliance with the requirements of 10 CFR Part 50, Appendix B, and NuStart and Dominion contracts in support of the ESBWR Project. GEH corrective actions, responsive to the reported findings, and closure of the audit and findings were also reviewed and found satisfactory.

c. Conclusions

The NRC audit team concluded that the audit process requirements were appropriately translated into implementing procedures and, for those activities reviewed by the NRC audit team, implemented as applicable by the applicants and their sub-suppliers. Audits, surveillances, and surveys conducted by the applicants and their primary contractors were satisfactory and resolution of identified deficiencies were adequately being documented, tracked, and resolved in a timely manner. The NRC audit team identified one issue, ARR 3.8-1, requiring additional corrective actions by the COL applicants and GEH prior to completion of the COLAs.

3.9 TRAINING AND QUALIFICATION OF PERSONNEL

a. Audit Scope

The NRC audit team reviewed the QA program to verify that it provided for the indoctrination and training of personnel performing activities affecting quality to assure that proficiency was achieved and maintained. Specifically, the NRC audit team verified that the applicants, GEH, and the applicants' contractors adequately implemented and maintained personnel training and qualification processes.

b Observations

b.1 Policies and Procedures for Training and Qualification of Personnel

The Bechtel Quality Assurance manual, Revision 4, established the requirements and responsibilities for the indoctrination and training program required to assure that personnel performing North Anna COLA development activities affecting quality had proficiency levels commensurate with their work requirements. The manual also stated that where certification was required, the individual shall demonstrate the capability of meeting the certification requirements.

NuStart's Project Planning Document (PPD), NuStart-001, Revision 5, provided the overall requirements for qualification, training, and certification of personnel whose activities affected the quality of safety-related SSCs for Grand Gulf's COLA development. It also provided a list of applicable Enercon Corporate Standard Procedures (CSPs) contained in Enercon's Corporate Quality Assurance Program Manual, Revision 9. Enercon's Corporate Quality Assurance Program Manual, Revision 9, prescribed the activities required for providing QA indoctrination and training of personnel at the initiation of a project, as well as measures for update training, and for orientation of new personnel during the project's duration. The manual also stated that

the program shall include control mechanisms to ensure that competent personnel were assigned for each activity commensurate with its type and importance.

The MACTEC Quality Assurance Manual, Revision 1, established the requirements and procedures for the development, implementation, and maintenance of programs for personnel training and qualification. The manual ensured that personnel selected to perform and/or manage activities affecting quality were appropriately trained and qualified.

b.2 Procedural Training

Dominion Quality Assurance manual, Revision 2, included AR-NA-200, "Personnel Qualification and Training," Revision 0, that described the QA indoctrination of project personnel performing North Anna COLA related activities.

Bechtel Quality Assurance manual, Revision 4, included 3DP-G05G-00034, "Engineering Department Procedure Instructions Quality Indoctrination Orientation and Training," Revision 2, that described the QA indoctrination of project personnel performing safety-related activities on the North Anna COLA.

Enercon's Corporate Quality Assurance Program Manual, Revision 9, included CSP 2.03, "QA Training Requirements," Revision 4, that described the QA indoctrination of project personnel performing safety-related activities on the Grand Gulf COLA.

The GEH QAP included EOP 75-200, "Qualification and Certification of Personnel," Revision 15, that described the indoctrination of personnel performing Grand Gulf and North Anna COLA development. The NRC team reviewed Section 7, "Lead Auditor Qualification," of EOP 75-200.

Based on the NRC Team's review of the training procedures discussed above, the team determined that the training and qualification requirements were appropriately translated into procedures necessary to support North Anna and Grand Gulf COLA development.

b.3 Supplier Technical Training and Qualification

GEH subcontractor work for the project was conducted under GEH's Quality Assurance Program and implementing procedures. Under GEH's quality program, non-safety related work conducted by a GEH contractor does not require a qualification audit nor does an evaluation of the subcontractor's quality program need to be conducted if the contractor was working under GEH's quality program.

GEH purchase orders for three contractors working on the COLA activities were examined and found to require contractor training on applicable GEH quality procedures and that training records be retained by GEH. The NRC audit team reviewed training records for the work conducted by Panlyon Technologies, which was conducted in part at a remote facility from the GEH facility. No objective evidence was provided that Panlyon employees working on COLA activities had been trained to GEH procedures prior to or during the course of their work. The NRC team found that the GEH audit organization had previously identified a similar training deficiency, as documented in Corrective Action Report No. 43565, dated September 7, 2007. The team found the GEH's actions in response to the identified CAR resolved the issue.

b.4 Training and Qualification Records Review

The NRC audit team reviewed a sample of training and qualification records for Dominion, Bechtel, NuStart, Enercon, and GEH and their respective sub-contractors to verify that individuals were properly qualified and indoctrinated to perform safety-related work. The NRC audit team also verified the maintenance and storage of records was in accordance with project procedures. The records reviewed included QA briefing agendas checklists, resumes, projected procedure update memos, and personnel attendance certifications.

The NRC audit team reviewed several CARs related to training and qualification drafted as a result of an external audit performed by TVA (2006V-24) dated November 8, 2006. Certification of personnel for the Grand Gulf COLA project was limited to auditors. The qualifications of three lead auditors involved in the COLA project activities were reviewed. TVA found that the auditors were properly certified, but annual recertification was not conducted for 2006. DR-2006V-24-03 was written to document this discrepancy. NuStart accepted DR-2006V-24-03 and submitted its corrective actions to TVA. TVA evaluated the corrective action and its implementation and determined that it was satisfactory. At the time of the audit, DR-2006V-24-03 was considered closed.

The NRC audit team reviewed several training records for Dominion personnel working on the North Anna COLA project and found that the records were not in compliance with AR-NA-200, "Personnel Qualification and Training," Revision 0. AR-NA-200 contains Attachment 3, "Project Specific Training Records," that documents project personnel training and qualifications. The NRC audit team observed that no project specific training records existed. Dominion opened CAR No. 019758 that documented this non-compliance with AR-NA-200. Dominion found that AR-NA-200, Attachment 3 was redundant to another existing document, the "Position Training Record." The corrective action associated with this CAR revised AR-NA-200 to take credit for the other existing document.

The NRC audit team reviewed a sample of training and qualification records for Enercon and its suppliers working on the Grand Gulf COLA project to verify that individuals were properly qualified and indoctrinated to perform safety-related work in accordance with Enercon's CSP 2.03, "QA Training Requirements," Revision 4. The NRC audit team reviewed a sample of two training and qualification records for Enercon and also for Terra Solve, a subcontractor of Enercon. The training and qualification records complied with CSP 2.03.

The NRC audit team reviewed a sample of training and qualification records for Bechtel and its suppliers working on the North Anna COLA project to verify that individuals were properly qualified and indoctrinated to perform safety-related work in accordance with 3DP-G05G-00034. The NRC audit team reviewed a sample of two training and qualification records for Bechtel and also for Tetra Tech, a subcontractor of Bechtel. The training and qualification records complied with 3DP-G05G-00034.

c. Conclusions

The NRC audit team concluded that the training and qualification requirements have been appropriately translated into implementing procedures and, for those activities reviewed by the team, implemented as required by the applicant's and/or its sub-supplier's procedures to support the North Anna and Grand Gulf COLA development programs. Qualification records were found to be in accordance with the applicant's and its sub-supplier's procedural requirements.

3.10 Regulatory Guide 1.206 Consistency Evaluation

a. Audit Scope

Upon receipt of a COLA, the NRC staff will perform a review in order to determine whether the application is acceptable for docketing. This review will assure that the COLA addresses the information required by 10 CFR Part 52. In order to assist applicants in the preparation of their COLAs, the staff issued RG 1.206. The NRC audit team reviewed the applicants' procedures for COLA development and selected draft sections of the Grand Gulf and North Anna final safety analysis reports (FSARs) against the guidance in RG 1.206. The audit team also discussed, with the applicants and their contractors, the handling of departures from the DCD, the means of identifying and tracking COL action items, the processes to ensure that the COLA was of high quality, and the overall COLA production schedule.

b. Observations

To support the applicants' documented process for development, review, and revision of the FSAR, each draft FSAR section package included "conformance evaluation tables" to ensure the section adequately addresses the NRC Standard Review Plan, RG 1.206, applicable Regulatory Guides and NUREG reports, generic issues, operational experience, and industry codes and standards, and, in addition, identifies applicable COL items, commitments, Statements of Fact, and Open Items. The audit team observed that the applicants had a consistent approach for developing/reviewing FSAR section packages but identified inconsistencies in the implementation of the approach. The conformance evaluation tables for both the Grand Gulf and North Anna FSAR section packages were identical, but the contents in the respective tables were different. For example, one section of the Grand Gulf FSAR identified COL items but the same section of the North Anna FSAR did not identify any COL items. The applicants should review these differences to ensure completeness and accuracy of the Grand Gulf and North Anna FSARs.

Following discussion of this issue with the applicants by the audit team, the applicants stated that GEH had not identified COL items by means of a structured numbering scheme in Revision 3 of the ESBWR DCD that would enable the COL applicants to readily track individual COL items. GEH had committed to resolving this issue in Revision 4 of the DCD. After the audit, on September 28, 2007, GEH submitted DCD Revision 4 and the NRC audit team found that COL items were appropriately identified by means of a structured numbering scheme and, therefore, this issue was satisfactorily resolved.

The audit team reviewed selected draft sections of both the Grand Gulf and North Anna FSARs and observed an extent of standardization both between the FSARs and with the ESBWR DCD that was consistent with NRC expectations for the agency's design-centered review approach for COLAs. The team observed that development of all sections of the Grand Gulf and North Anna FSARs was progressing but, at the time of the audit, all sections were yet to be finalized.

c. Conclusions

The applicants were preparing COLAs for Grand Gulf and North Anna consistent with the guidance provided in RG 1.206. At the time of this audit, based upon review of the applicants' procedures for COLA development, review of selected draft sections of the FSARs, and

interviews with the applicants and their contractors, the audit team estimated that both the Grand Gulf and North Anna FSARs were approximately 75 percent complete.

4.0 ENTRANCE AND EXIT MEETINGS

During the entrance meeting on September 10, 2007, the NRC audit team discussed the scope of the audit, outlined the areas to be reviewed, established interfaces with Dominion, Bechtel, NuStart, Entergy, Enercon, and GEH staff and management involved in the Grand Gulf and North Anna COLA development. During the exit meeting on September 14, 2007, the NRC audit team discussed the activities conducted during the audit and identified two issues associated with COLA development with representatives of Dominion, Bechtel, NuStart, Entergy, Enercon, and GEH management and staff.

5.0 PARTIAL LIST OF PERSONS CONTACTED

NAME	POSITION	AFFLIATION
Raj Jolly*	Project QA Manager	Bechtel
Richard Baker*	North Anna COL Project Engineer	Bechtel
Steve Roulh*	Project Manager	Bechtel
Joe Hegner*	Supervisor Licensing	Dominion
Marvin Smith***	Director COL Projects	Dominion
David Batalo***	Supervisor Projects	Dominion
Richard Baker*	Project Engineer - COL Projects	Dominion
Steve Routh***	COL Project Manager	Dominion
Joe Hagner*	Supervisor Licensing COL Project	Dominion
Gabe Salamon*	COLA Licensing Manager	Enercon
Richard Ladesic*	QA Manager	Enercon
Al Scheider *	Project Manager – Grand Gulf COLA	Enercon
George Zinke	Licensing Lead	Entergy/NuStart
William Hughey	Senior Manager	Entergy
Julie Atento*	QA Manager	GEH
Larry Tucker**	Manager – ESBWR Design	GEH
Steve Love*	Project Manager - ESBWR COLA	GEH
Kerry Rhoads*	Nuclear Specialist	GEH
Stephen Mindel*	QA Engineer	GEH
Davis Piepmeyer*	Project Manager - ESBWR DCD	GEH
Russ Bastyr*	QA/Engineer Control Manager	GEH
George Honma*	Regulatory Affairs Engineer	GEH
James Kinsey*	Project Manager, Licensing	GEH
David Hinds**	New Units Project Manager	GEH
Mark Blue*	Sr Commodity Leader	GEH
Mark Campagna*	NPP Senior Project Manager	GEH
Allen Dubberley****	Engineering Tech Leader	GEH
Jim Kinsey*	Project Manager - ESBWR Regulatory Affair	GEH
Brain Johnson*	NPP Project Engineer	GEH/NuStart
Jim Cassidy*	QA Lead	NuStart

Attended entrance and exit meeting*
Attended exit meeting**
Attended exit meeting by phone***
Attended entrance meeting****

6.0 References

Bechtel Documents

- Bechtel Nuclear Quality Assurance Manual (NQAM), Revision 4, dated April 13, 2004.
- Bechtel EDPI 3DP-G04G-00022, “Licensing Document Review and Approval,” Revision 1, dated April 10, 2007.
- Bechtel EDPI 25161-001-3DP-G04G-00023, “Preparation of the Combined License Application,” Revision 0, dated June 14, 2007.
- Bechtel Engineering Department Procedure Instruction (EDPI) 3DP-G06G-00009, “Supplier Document Submittal Requirements and Document Review Process,” Revision 5, dated March 9, 2007.
- Bechtel’s Policy No. Q-6.1, “Policy, Manual, and Procedure Control”
- Bechtel’s Policy No. Q-7.1, “Subcontractor Control”
- Bechtel’s Policy No. Q-16.1, “Corrective Action Program”
- Bechtel’s Policy No. Q-16.2, “Significant Reportable Deficiencies”
- Bechtel’s Policy No. Q-17.1, “Office Records Retention/Turnover”
- Bechtel’s Policy No. Q-18.1, “Quality Assurance Audits”
- Bechtel Frederick Execution Unit (FREU) administrative procedure, FAP 2KP-K01G-00039-003, “Quality Records.”
- Bechtel Corporate Engineering Procedure 3DP-G04-00066, Revision 1, dated April 30, 2001.
- Bechtel Corporate Instruction G31-7GKK-A1401, Reporting Defects and Noncompliances to the Nuclear regulatory Commission (10 CFR 21), dated August 2007
- Bechtel Corporation Engineering, Engineering Department Procedure (EDP) Reporting Deviations, defects, and Noncompliance to the NRC 3DP-G04--00066, Revision 1, dated April 30, 2001.
- Bechtel Corporate Engineering Procedure, 3DP-G05G-00034, Instructions Quality Indoctrination Orientation and Training, Revision 2, dated Feb 28, 2005.
- Bechtel Contract with MACTEC Engineering and Consulting, Inc PO 70157983, dated June 29, 2006.

Dominion Documents

- Dominion, “Nuclear Facility Quality Assurance Program Description (QAPD),” Topical Report (TR) DOM-QA-1, Revision 2
- Dominion Corporate Procedure DNAP-1802, Revision 2, “Quality Assurance Program Elements for Supply Chain Management,”
- Dominion Administrative Procedure, Dominion Administrative Procedure, AR-NA-400-1001, “COL Application Style Guide,” Revision 1, dated August 21, 2006.
- Dominion Program Description AR-NA10, “Combined License Project – Project Execution Plan,” Revision 2, dated February 5, 2007.
- Dominion Administrative Procedure AR-NA-200 Revision 0, Personnel Qualification and Training Bechtel Corp. Power Global Business unit-Engineering.
- Dominion Administrative Procedure, AR-NA-400-1001, “COL Application Style Guide,” Revision 1, dated August 21, 2006.
- Dominion Administrative Procedure, AR-NA-400, “Preparation and Processing of the Combined License Application,” Revision 1, dated September 12, 2007.
- Dominion’s Station Administrative Procedure, VPAP-0601, “Document Distribution and Control.”
- Dominion’s Station Administrative Procedure, VPAP-1701, “Records Management.”
- Dominion’s Administrative Procedure, AD-AA-101, “Preparation and Processing of Procedures and Guidance and Reference Documents.”
- Dominion’s Station Administrative Procedure, VPAP-1701, “Records Management.”
- Dominion Station Administrative Procedure VPAP-0401, Revision 13, “Material, Equipment, or Services Needs Identification,”
- Dominion Station Administrative Procedure VPAP-0404, Revision 6, “Procurement Interfaces,”

Duke Documents

- Duke Energy's QAM, Duke Energy-010

Enercon Documents

- Enercon Quality Assurance Manual, Revision 9, dated April 8, 2004, for the Grand Gulf Application.

- Enercon Project Management Plan NuStart COL Applications Development, Revision 2, dated July 17, 2007.

- Enercon Corporate Standard Procedure (CSP) 17.03, Revision 1, “Quality Assurance Records"

- Enercon Corporate Standard Procedure (CSP) 16.02, Revision 5, “Evaluation and Reporting of 10 CFR 21, Defects and Non-Compliance.”

- Enercon CSP 2.03 “QA Training Requirements Vendor Program Audit DA 2006-111 Audit report transmittal, Revision 4, dated December 28, 2006

- Enercon Service Audit Report of the Mactec E&C QA Program MAC-AUD-01, dated January 12, 2006

- Enercon Procedure CSI 2.03 Quality Assurance Training Requirements, Revision 4

- Enercon DRW-06-74, Enercon Response to TVA Supplier Audit 2006V-24, dated December 4, 2006

Entergy Documents

- Entergy Quality Assurance Program Manual (QAPM), Revision 16, dated April 11, 2007.

GEH Documents

- GEH Quality Assurance Program Description, NEDO-11209-04A, Revision 8, dated March 31, 1989.

- GEH Documents 26A6641, ESBWR Tier 1 Design Control Document, Revision 3

- GEH Documents 26A6642, ESBWR Tier 2 Design Control Document, Revision 3

- GEH Documents 26A6641, ESBWR Tier 1 Design Control Document, Revision 4

- GEH Documents 26A6642, ESBWR Tier 2 Design Control Document, Revision 4

- GEH Policies and Procedures 70-14, “Nuclear Energy Quality Assurance Audit Requirements,” dated February 6, 2007.

- GEH NEDC 33350, “COLA Writer’s Guide,” Revision 5, dated August 28, 2007.

- GEH Policy and Procedures Procedure, Policy 100-1, “GHNEA Policies and Procedures”

- GEH Engineering Operating Procedure, EOP 75-3.00

- GEH Engineering Operating Procedure, EOP 75-6.00, “Quality Assurance Records”
- GEH Policy and Procedures Procedure, Procedure 70-50, “Handling and Storage of Quality Assurance Records”
- GEH EOP 75-200, Qualification and Certification of Personnel, Revision 15, dated August 29, 2007

MACTEC Documents

- MACTEC Quality Assurance Project Document (QAPD), Geotechnical Services North Anna COL Project No. 6468-06-1472.

- MACTEC Procedure for Quality Assurance Project Document (QAPD), Revision 5, dated June 17, 2005.

- MACTEC Quality Assurance Manual (QAM), MACTAC Engineering and Consulting, Revision 1, dated June 17, 2005.

NUPIC Documents

- NUPIC Audit Report No. 10211

NuStart Documents

- NuStart Project Instruction, PI-007, “Records Management Plan”

- NuStart Project Instruction, PI-008, “Document Control Practices”

- NuStart Project Instruction PI-009, “Nustart Energy Quality Assurance Plan” Revision 12

- NuStart Project Instruction PI-014, “NuStart COLA Review,” Revision 1

- NuStart Project Instruction PI-015, Change Control for COLA Information, draft Revision A

- NuStart/Entergy Work Authorization BREI002, “Work Authorization for NuStrart/Entergy Grand Gulf COL Application Support.”

- NuStart Combined License Applications Development Project, Project No. NUSTART- 001, Revision 5

- NuStart Project Procedure G-001, “COL Application First Draft/Annotated Outline Writer's Guide,” Revision 4, dated October 25, 2006.

- NuStart Project Procedure G-002, “COL Application Preparation Instructions,” Revision 6, dated June 29, 2007.

- NuStart Contract 00406328, Join Audit of Enercon Services Incorporated, TVA Supplier Audit 2006V-24, dated Nov, 8, 2006

- NuStart Contract 0040628. NuStart Join Audit of Enercon Services Incorporated, dated June 14, 2007.

- NuStart Energy Development Agreement with Entergy Operations, Inc, dated December 1, 2006

- NuStart Energy Development Agreement with General Electric Company, dated May 4, 2005

Other Documents

- COLA Sect. 10.1, DRF 0000-0070-0287, Engineering Operating Procedures, EOP 42-1.00, Design Process, Administrative Records (AR)-NA-400, Preparation and Processing of the COLA, AR-NA-501, Transmittal of Technical Information, AR-NA-300, Quality Assurance, NuStart Project Instructions and Enercon's and Dominion's Training Records

- Review Standard (RS)-002, "Processing Applications for Early Site Permits," Section 17.1, Early Site Permit Quality Assurance Controls.