NRR-PMDAPEm Resource

From: Orenak, Michael
Sent: Monday, January 09, 2017 9:22 AM
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Cc: Palmrose, Donald; Scarbrough, Thomas
Subject: Audit Plan for Summer LAR 15-11 and Vogtle LAR 16-028 (Boric Acid Storage Tank Suction Point)
Attachments: Audit plan.docx

Greg and Paige,

By letter dated September 29, 2016, South Carolina Electric and Gas Company (SCE&G, the licensee) submitted license amendment request (LAR) 15-11 to revise the Combined Licenses (COLs) of Virgil C. Summer Station (Summer), Units 2 and 3, regarding the configuration of the boric acid storage tank (BAST) suction point and to align the Tier 1 Chemical and Volume Control System (CVS) makeup flow rate with the previously approved underlying Tier 2 information. On October 26, 2016, Southern Nuclear Operating Company (SNC) submitted a similar request for the Vogtle Electric Generating Plant (Vogtle), Units 3 and 4, in LAR-16-028 (ADAMS Accession No. ML16300A325). The U.S. Nuclear Regulatory Commission (NRC) staff has determined that a regulatory audit of the Summer, Units 2 and 3, and Vogtle, Units 3 and 4, LARs should be conducted in accordance with the Office of New Reactors Office Instruction, NRO-REG-108, "Regulatory Audits," for the NRC staff to gain a better understanding of the licensee's calculations, proposed plant modifications, and other aspects of the LAR. The audit will be held January 9-16, 2017.

A regulatory audit is a planned license or regulation-related activity that includes the examination and evaluation of primarily non-docketed information. A regulatory audit is conducted with the intent to gain understanding, to verify information, and/or to identify information that will require docketing to support the basis of the licensing or regulatory decision. Performing a regulatory audit for the licensee's information is expected to assist the NRC staff in efficiently conducting its review or gain insights on the licensee's processes or procedures. Information that the NRC staff relies upon to make the safety determination must be submitted on the docket.

If you have any questions, please contact me at 301-415-3229 or via e mail at Michael.Orenak@nrc.gov.

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AUDIT OF REPORTS AND CALCULATIONS IN SUPPORT OF REQUEST FOR LICENSE AMENDMENTS AND EXEMPTIONS RELATED TO BORIC ACID STORAGE TANK SUCTION POINT ITAAC CHANGES

SOUTHERN NUCLEAR OPERATING COMPANY
VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4
Docket Nos. 52-025 and 52-026

SOUTH CAROLINA ELECTRIC AND GAS COMPANY
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY
VIRGIL C. SUMMER NUCLEAR STATION, UNITS 2 AND 3
Docket Nos. 52-027 and 52-028

Location: NRC Headquarters
Two White Flint North
11545 Rockville Pike
Rockville, Maryland 20852-2738

Purpose:

The purpose of the audit is to review the reports and calculations needed by staff to verify the information and conclusions in the "Request for License Amendment and Exemption: Boric Acid Storage Tank Suction Point ITAAC Changes," submitted by South Carolina Electric and Gas Company (SCE&G, the licensee) for the Virgil C. Summer Station (Summer), Units 2 and 3, in LAR 15-11 on September 29, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16273A557). Although this audit plan describes LAR 15-11 submitted by SCE&G, the audit results will also be applicable to a similar request submitted on October 26, 2016, by Southern Nuclear Operating Company (SNC) for the Vogtle Electric Generating Plant (Vogtle), Units 3 and 4, in LAR-16-028 (ADAMS Accession No. ML16300A325).

Background:

In LAR 15-11 and LAR-16-028, SCE&G and SNC propose to revise the Combined Licenses (COLs) in regard to the configuration of the boric acid storage tank (BAST) suction point and to align the Tier 1 Chemical and Volume Control System (CVS) makeup flow rate with the previously approved underlying Tier 2 information. In particular, LAR 15-11 proposes changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from a plant-specific Design Control Document (PS-DCD) Tier 2 figure and a COL Appendix C table. LAR 15-11 also proposes changes to the inspections, tests, analyses, and acceptance criteria (ITAAC) in Appendix C to the Summer, Units 2 and 3, COL, and associated plant-specific DCD Tier 1 information in Table 2.1.2-4, "Inspections, Tests, Analyses, and Acceptance Criteria."

The NRO Projects staff determined that an audit of the reports and calculations supporting these LARs is the appropriate method to verify this proposed change aligns the ITAAC requirement with the underlying Tier 2 descriptions and analyses, rather than by issuing multiple rounds of requests for additional information (RAIs).

Regulatory Audit Basis:

Title 10 of the *Code of Federal Regulations* (CFR), Section 52.98(f), specifies that any modification to, addition to, or deletion from the terms and conditions of a COL including any modifications to, addition to, or deletion from the ITAAC contained in the license is a proposed amendment to the license. In LAR 15-11, the licensee proposes changes to Summer, Units 2 and 3, COL Appendix C ITAAC, with corresponding changes to the associated plant-specific DCD Tier 1 information. In LAR-16-028, similar changes are proposed. Therefore, NRC approval is required prior to making the plant-specific proposed changes described in LAR 15-11 and LAR-16-028.

General Design Criterion (GDC) 29 in Appendix A to Part 50 of 10 CFR Part 50 requires that reactivity control systems be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences. Portions of the CVS are relied upon to provide negative reactivity addition and assure that specified acceptable fuel design limits (SAFDLs) will not be exceeded. NRC Standard Review Plan Section 9.3.4, "Chemical and Volume Control System (PWR) (Including Boron Recovery System)," (ADAMS Accession No. ML070160660) provides guidance for NRC staff review of license applications regarding GDC 29 by specifying that the amount of boric acid stored in the CVS, such as a BAST, exceeds the amount required to borate the reactor coolant system to cold shutdown concentration, assuming that the control rod assembly with the highest reactivity worth is held in the fully withdrawn position, and to compensate for subsequent xenon decay during any part of core life.

As described in Section 9.3.6 of the Final Safety Evaluation Report (FSER) related to certification of the AP1000 standard plant design (NUREG-1793, Volume 2, Supplement 2, ADAMS Accession No. ML11293A073), the NRC staff evaluated the BAST increase in the usable volume of the tank from 264,979 liters (L) to 278,285 L (70,000 to 73,515 gallons). The increased BAST volume would accommodate Summer, Units 2 and 3, shutting down from 100 percent power to Mode 6, plus the volume needed for normal operation and operating margin. The increased volume was calculated with updated inputs that more accurately represent the AP1000 design.

As part of the proposed changes, the licensee requests to relocate the inlet/outlet line for the BAST from the bottom of the tank to the side of the tank. The new piping line would also use a "gooseneck" piping configuration with an anti-vortex device in the tank nozzle to minimize the unusable tank volume (see revised UFSAR Figure 9.3.6-1, Sheet 2 of 2, provided in the LAR). However, the LAR did not provide the revised effective BAST volume and the basis for this volume between the internal elevations of the new suction inlet to the tank overflow. Rather, the LAR states that the usable BAST volume would be reduced by approximately 600 gallons. Additionally, the LAR does not address how the gooseneck piping arrangement and the anti-vortex device (and its location) would prevent the potential negative effects on the CVS system once the BAST level decreases to the internal elevation of the suction inlet, resulting in gas entrainment into the CVS piping.

The NRC staff will follow NRO Office Instruction NRO-REG-108 (Revision 0), "Regulatory Audits," (ADAMS Accession No. ML081910260) in performing the audit of the reports and calculations cited below.

Regulatory Audit Scope:

The primary scope of this audit is to review the calculations that support the proposed changes to the BAST suction line in LAR 15-11. The specific tasks to be performed during the audit are:

1. Obtain sufficient information on the BAST to determine the available volume, accounting for the revised suction line configuration.

2. Obtain the dimensions including pipe lengths, bends or elbows and the pipe schedule for the gooseneck piping configuration inside the BAST.

3. For the anti-vortex device to be installed in the suction line to the CVS makeup pumps, obtain (a) a description of the anti-vortex device, (b) its material, structural, and performance characteristics, (b) quality assurance provisions, (c) the dynamic, functional, and environmental provisions, and (d) review the testing plans for the CVS makeup pumps that demonstrate that they are capable of performing their intended functions with the anti-vortex device in the suction line.

4. Review the analysis of the expected operational performance of the CVS once the BAST level reaches the lowest water level elevation in relationship to the new suction point, with specific consideration for gas entrainment into the CVS. Include a description, as appropriate, regarding how the gooseneck piping arrangement is expected to mitigate gas entrainment and the formation of a vortex inside the BAST.

Documents and Information Necessary for the Audit:

The following documents are to be made available to the NRC staff either at a local office or in the electronic reading room:

1. AP1000 Calculation APP-CBS-M3C-065, “Chemical and Volume Control System (CVS) Boric Acid Storage Tank (BAST) Suction Nozzle Submergence Evaluation,” September 6, 2016.

2. AP1000 Drawing APP-MT5A-V0-001, “MT5A CVS Boric Acid Storage Tank Envelope Drawing,” June 2, 2014.

3. Design and procurement specifications for the anti-vortex device to be installed in the suction line to the CVS makeup pumps that include the information specified in this audit plan.

Appropriate handling and protection of proprietary information shall be acknowledged and observed throughout the audit.

Audit Staff:

Donald E. Palmrose, Senior Reactor Engineer (NRC)
Thomas G. Scarbrough, Senior Mechanical Engineer (NRC)
Michael D. Orenak, Project Manager (NRC)

Licensee Contacts:

Paige Ridgway (SNC)
Nick Kellenberger (SCE&G)
Greg Travers (SCE&G)

Audit Activities and Deliverables:

The NRC staff will address the technical areas identified in the Regulatory Audit Scope of this audit plan.

The audit will be conducted in support of the schedule for completion of the LAR 15-11 and LAR-16-028 reviews with entrance and exit dates to be determined. The level of effort is estimated to be a total of 40 hours to perform the audit and issue the audit report.

Depending on the availability of the licensee's documentation, the audit is planned to be conducted between January 9, 2017, and January 16, 2017. The audit is intended to be conducted from the NRC Headquarters via the licensee's electronic reading room; however, the audit may be performed at a local office of the licensee, if the technical information is only retained in hard copy.

The NRC staff acknowledges the proprietary nature of the information requested. It will be handled appropriately throughout the audit. While the NRC staff will take notes, the staff will not remove hard copies or copy electronic files.

At the completion of the audit, the NRC staff will prepare an audit report within 45 days that will be declared and entered as an official agency record in ADAMS. The audit outcome may be used to identify any additional information to be submitted for making regulatory decisions, and will assist the NRC staff in the issuance of RAIs (if necessary) in completing its review of LAR 15-11 and LAR-16-028. With the planned exit telecom on January 16, 2017, the audit report will be completed by March 2, 2017.

If necessary, any circumstances related to the performance of the audit will be communicated to Michael Orenak (NRC) at 301-415-3229 or Michael.Orenak@nrc.gov