



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

May 11, 2016

Peter P. Sena, III
President
PSEG Nuclear LLC – N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: REGULATORY AUDIT PLAN FOR MAY 23 - 26, 2016, AT SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2, IN SUPPORT OF LICENSE AMENDMENT REQUEST TO MODIFY CHILLED WATER SYSTEM REQUIREMENTS (CAC NOS. MF6724 AND MF6725)

Dear Mr. Sena:

By letter dated September 11, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15254A387), as supplemented by letters dated November 5, 2015, and March 31, 2016 (ADAMS Accession Nos. ML15309A750 and ML16091A237, respectively), PSEG Nuclear LLC (the licensee) submitted a license amendment request (LAR) for the Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The proposed amendment would revise the technical specifications to support planned modifications to implement chiller replacements and for performing maintenance on common line components.

To support its review of the LAR, the U.S. Nuclear Regulatory Commission staff plans to conduct a regulatory audit at the Salem site from May 23 to May 26, 2016, to verify information submitted by the licensee and the supporting calculations. The regulatory audit plan to support the review of the chilled water system is enclosed.

P. Sena, III

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If you have any questions, please contact me at (301) 415-4037 or Thomas.Wengert@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas J. Wengert". The signature is fluid and cursive, with the first name "Thomas" and last name "Wengert" clearly legible.

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosure:
Regulatory Audit Plan

cc w/enclosure: Distribution via Listserv

REGULATORY AUDIT PLAN FOR AUDIT AT
SALEM NUCLEAR GENERATING STATION
TO SUPPORT REVIEW OF THE LICENSE AMENDMENT REQUEST
TO MODIFY THE CHILLED WATER SYSTEM REQUIREMENTS
PSEG NUCLEAR LLC
SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311

Background

By letter dated September 11, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15254A387), as supplemented by letters dated November 5, 2015, and March 31, 2016 (ADAMS Accession Nos. ML15309A750 and ML16091A237, respectively), PSEG Nuclear LLC (PSEG or the licensee) submitted a license amendment request (LAR) to modify the technical specifications (TSs) for the Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The LAR proposes to change TS 3/4.7.10, "Chilled Water System - Auxiliary Building Subsystem," and TS 3/4.7.6, "Control Room Emergency Air Conditioning System."

Specifically, the licensee requested to revise TS 3/4.7.10 to allow for:

- 1) planned chiller replacement (three per unit for a total of six chillers), and
- 2) maintenance on common chilled water components with operating a unit cross-tie.

In addition, the licensee requested to revise TS 3/4.7.6 to add a note stating that certain alignments of the control room emergency air conditioning system are only permitted when the chiller units are in the cross-tied configuration.

The U.S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of these TS changes. Due to the complexity of the proposed TS changes, supporting calculations, and computer based modelling, the staff has determined that face-to-face interactions at the Salem site can resolve complex technical issues more quickly than several rounds of request for additional information (RAI) questions with followup responses from the licensee. Face-to-face interactions will also allow the staff to review and assess physical aspects of the LAR at the site through field walkdowns.

The NRC staff has determined that a regulatory audit of the Salem chilled water system LAR should be conducted in accordance with the Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits," for the NRC staff to gain a better understanding of the licensee's calculations and other aspects of the LAR.

Enclosure

Regulatory Audit Basis

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 for the licensing or regulatory decision.

The regulatory bases for the audit are described in Salem's Updated Final Safety Analysis Report (UFSAR), Section 3.1.2, "Conformance with Atomic Energy Commission (AEC) Proposed General Design Criteria (GDC) (July 1967)."

Applicable Regulatory Requirements and Criteria (1967)

Criterion 1 - Quality Standards

Those system and components of reactor facilities which are essential to the prevention of accidents which could affect the public health and safety or to mitigation of their consequences shall be identified and then designed, fabricated, and erected to quality standards that reflect the importance of the safety function to be performed. Where generally recognized codes or standards on design, materials, fabrication, and inspection are used, they shall be identified. Where adherence to such codes or standards does not suffice to assure a quality product in keeping with the safety functions, they shall be supplemented or modified as necessary. Quality assurance programs, test procedures, and inspection acceptance levels to be used shall be identified. A showing of sufficiency and applicability of codes, standards, quality assurance programs, test procedures, and inspection acceptance levels used is required.

Criterion 2 - Performance Standards

Those systems and components of reactor facilities which are essential to the prevention of accidents which could affect the public health and safety or to mitigation of their consequences shall be designed, fabricated and erected to performance standards that will enable the facility to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as earthquakes, tornadoes, flooding conditions, winds, ice, and other local site effects. The design bases so established shall reflect: (a) appropriate consideration of the most severe of these natural phenomena that have been recorded for the site and the surrounding area and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design.

Criterion 4 - Sharing of Systems

Reactor facilities shall not share systems or components unless it is shown safety is not impaired by the sharing.

Criterion 11 - Control Room

The facility shall be provided with a control room from which actions to maintain safe operational status of the plant can be controlled. Adequate radiation protection shall be provided to permit access, even under accident conditions, to equipment in the control room or other areas as necessary to shut down and maintain safe control of the facility without radiation exposures of personnel in excess of 10CFR20 limits. It shall be possible to shut the reactor down and maintain it in a safe condition if access to the control room is lost due to fire or other cause.

Criterion 15 - Engineered Safety Features Protection Systems

Protection systems shall be provided for sensing accident situations and initiating the operation of necessary engineered safety features.

Criterion 21 - Single Failure Definition

Multiple failures resulting from a single event shall be treated as a single failure.

Criterion 40 - Missile Protection

Protection for engineered safety features shall be provided against dynamic effects and missiles that might result from plant equipment failures.

The regulatory bases for the audit are described in Salem's UFSAR, Section 3.1.3, "Conformance with AEC Proposed GDC (July 1971)."

Applicable Regulatory Requirements and Criteria (1971)

Criterion 4 - Environmental and Missile Design Basis

The design of Salem Unit 1 complies with GDC 4 (GDC 4) with respect to protection against the dynamic effects associated with the postulated failure of piping. The PSE&G approach to evaluating high-energy line break consequences is described in Section 3.6 of the UFSAR and is consistent with the guidance provided by A. Giambusso, AEC, to all licensees in his letter dated December 1972, "General Information Required for Consideration of the Effects of a Piping System Break Outside Containment." For Unit 1, high energy piping systems are those whose temperature exceeds 200°F and whose pressure exceeds 275 psig [pounds per square inch gauge], coincidentally, during normal operation. Design basis cracks only are postulated for those systems whose pressure is more than 275 psig or whose temperature is more than 200°F [degrees Fahrenheit].

The design of Salem Unit 2 also complies with GDC 4 with respect to protection against the dynamic effects associated with the postulated failure of piping. However, for Unit 2, the criteria are provided by Branch Technical Position

APCSB 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment." For Unit 2, high-energy piping systems are those whose temperature exceeds 200°F or 275 psig during normal operation. This revised criteria resulted in three additional Unit 2 systems requiring analysis as high-energy. Those systems were: CVC charging and Reactor Coolant Pump seal injection, Heating Steam, and Heating Water. In addition to the revised temperature and pressure criteria, NRC required that a Moderate - Energy Break Analysis (MEBA) be performed for Unit 2.

Regulatory Audit Scope/Methodology

The purpose of this confirmatory audit is to determine if the calculations performed by PSEG for Salem support the bases for the proposed changes to TSs. The areas of focus for the audit are the calculation methodologies, assumptions, and results used to reach conclusions for the proposed TS changes and associated RAI responses listed below.

Duration

The on-site visit phase of the audit will be conducted from May 23 to May 26, 2016. The in-office phase of the audit will conclude by August 20, 2016.

Information Needs

PSEG is requested to provide one hard copy set of the references listed below. Half-size drawings are acceptable.

PSEG is requested to make accessible licensee personnel or contractors who are familiar with the design of Salem's chilled water system and associated air handling systems, calculations noted in the references (shown below), and GOTHIC model, to assist the NRC staff during the audit.

Additional information needs identified during the audit will be communicated to the designated point of contact.

Team Assignments/Resource Estimates

The resource estimate for this audit visit is approximately 80 hours of direct audit effort. The NRC staff performing this audit will be:

Audit Team

The audit team on site will consist of:

- Larry Wheeler, Audit Team Lead, Balance of Plant Branch Technical Reviewer
- Nicholas Hobbs, Balance of Plant Branch Technical Reviewer
- Thomas Wengert, Salem Project Manager, Plant Licensing Branch I-2

Support staff and management from NRC headquarters will consist of:

- Nageswara Karipineni, Balance of Plant Branch Technical Reviewer
- Robert Denning, Balance of Plant Branch Chief
- Matthew Hamm, Technical Specifications Branch Technical Reviewer

Logistics

The audit will start at 1:00 p.m. on Monday, May 23, 2016, and will conclude on Thursday, May 26, 2016. The estimated length of the audit is approximately 3 days. See Table 1 for audit agenda.

Special Request

PSEG is requested to provide a conference room to accommodate up to five NRC on-site staff with a telephone that allows conference calling with staff at NRC headquarters.

Deliverables

At the conclusion of the audit, the NRC staff will conduct an exit briefing and provide a summary of audit results in each subject area defined in the audit scope. The NRC staff plans to prepare a regulatory audit summary within 90 days of the completion of the audit.

References

PSEG calculations (primary focus of audit) and drawings:

1. PSEG Nuclear Calculation No. S-C-SW-MDC-1967, Service Water System Thermal Hydraulic Model, Revision 8.
2. PSEG Nuclear Calculation No. S-C-CH-MDC-2319, Hydraulic Evaluation of Salem Unit 1 and Unit 2 Chilled Water Systems during Reduced Chiller Availability, Revision 1.
3. PSEG Nuclear Calculation No. S-C-CH-MDC-2282, Chiller Service Water Flow Requirements, Revision 2.
4. PSEG Nuclear Calculation No. S-C-CAV-MDC-2320, Evaluation of the Control Area Ventilation System during Chilled Water System Chiller Replacement, Revision 1.
5. PSEG Calculation No. S-5-ZZ-MEE-1680, Historical River Temperature Data, Revision 0.
6. PSEG Vendor Technical Document (VTD) 903136(001) Revision 0, MPR-4027 Salem Chilled Water System Evaluation to Support Reduction in Required Chillers.
7. Piping and Instrumentation Drawings (P&IDs) for various related systems including the Chilled Water System.
8. PSEG LAR dated September 11, 2015 (ADAMS Accession No. ML15254A387).

9. PSEG LAR supplement dated November 5, 2015 (ADAMS Accession No. ML15309A750).
10. RAI responses dated March 31, 2016 (ADAMS Accession No. ML16091A237).
11. Other supporting calculations (as determined by PSEG and NRC staff).

Table 1: Audit Agenda

Date	Time	Item	Responsibility
Monday May 23, 2016	~10:30 a.m.- 12:00 p.m.	Site access badging and dosimetry and brief meeting with resident inspectors	PSEG
	12:00 p.m. – 1:00 p.m.	Lunch break	
	1:00 p.m. – 1:30 p.m.	Entrance meeting, introductions, discuss purpose and objectives of audit	NRC (NRC requests bridge line with NRC headquarters)
	1:30 p.m. – 3:00 p.m.	Overview of LAR and proposed TS changes with chilled water and control room HVAC system review Overview of supporting calculations RAI discussions	PSEG
	3:00 p.m. – 5:00 p.m.	Audit of calculations – RAI and TS discussions	NRC/PSEG
Tuesday May 24, 2016	8:30 a.m. – 10:30 a.m.	Plant walkdown/tour – CH AB chillers, main control room HVAC	PSEG
	10:30 a.m. – 12:00 p.m.	Audit of calculations – RAI and TS discussions	NRC/PSEG
	12:00 p.m. – 1:00 p.m.	Lunch break	
	1:00 p.m. – 4:30 p.m.	Audit of calculations – RAI and TS discussions	NRC/PSEG
	4:30 p.m. – 5:00 p.m.	Audit summary with PSEG	NRC
Wednesday** May 25, 2016	8:30 a.m. – 12:00 p.m.	Audit of calculations – RAI and TS discussions	NRC/PSEG
	12:00 p.m. – 1:00 p.m.	Lunch break	
	1:00 p.m. – 4:30 p.m.	Audit of calculations – RAI and TS discussions	NRC/PSEG
	4:30 p.m. – 5:00 p.m.	Audit summary with PSEG	NRC
Thursday** May 26, 2016	8:30 a.m. – 11:00 a.m.	Audit of calculations – RAI and TS discussions	NRC/PSEG
	11:00 a.m. – 11:30 a.m.	NRC audit summary with headquarters management	NRC (bridge line)

Date	Time	Item	Responsibility
Thursday** May 26, 2016	11:30 a.m. – 12:00 p.m.	Audit summary/exit with PSEG**	NRC (NRC requests bridge line with NRC headquarters)
	12:00 p.m.- 2:15 p.m.	Turn-in site badges and dosimetry	NRC/PSEG

**Audit exit may be adjusted based on NRC staff progress.

P. Sena, III

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If you have any questions, please contact me at (301) 415-4037 or Thomas.Wengert@nrc.gov.

Sincerely,

/RA/

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosure:
Regulatory Audit Plan

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ADAMS Accession No.: ML16127A029

**by memorandum*

OFFICE	NRR/DORL/LPLI-2/PM	NRR/DORL/LPLI-2/LA	NRR/DSS/STSB/BC
NAME	TWengert	LRonewicz	AKlein
DATE	5/10/2016	5/10/2016	5/11/2016
OFFICE	NRR/DSS/SBPB*	NRR/DORL/LPLI-2/BC	NRR/DORL/LPLI-2/PM
NAME	RDennig	DBroaddus (AHon for)	TWengert
DATE	4/27/2016	5/11/2016	5/11/2016

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