June 24, 2008

MEMORANDUM TO: Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Richard B. Ennis, Senior Project Manager ***/ra/***
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2, DRAFT REQUEST FOR ADDITIONAL INFORMATION (TAC NOS. MD8259 AND MD8260)

The attached draft request for information (RAI) was transmitted on June 24, 2008, to Mr. Jeff Keenan of PSEG Nuclear LLC (the licensee). This information was transmitted to facilitate an upcoming conference call in order to clarify the licensee's amendment request for Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2, dated March 11, 2008, as supplemented by letter dated June 17, 2008. The proposed amendment would revise the Technical Specification requirements for fuel decay time prior to commencing movement of irradiated fuel in the reactor pressure vessel.

This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket Nos. 50-272 and 50-311

Attachment: Draft RAI

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DRAFT REQUEST FOR ADDITIONAL INFORMATION

REGARDING PROPOSED LICENSE AMENDMENT

DECAY TIME TECHNICAL SPECIFICATION REQUIREMENTS

SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-272 AND 50-311

By letter dated March 11, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080930080), as supplemented by letter dated June 17, 2008, PSEG Nuclear LLC (PSEG or the licensee) submitted an amendment request for Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The proposed amendment would revise the requirements for fuel decay time prior to commencing movement of irradiated fuel in the reactor pressure vessel (RPV). Currently, Technical Specification (TS) 3/4.9.3, "Decay Time," requires that: (a) the reactor has been subcritical for at least 100 hours[1] prior to movement of irradiated fuel in the RPV between October 15th through May 15th; and (b) the reactor has been subcritical for at least 168 hours prior to movement of irradiated fuel in the RPV between May 16th and October 14th. The calendar approach is based on average river water temperature which is cooler in the fall through spring months. The proposed amendment would allow fuel movement to commence at 80 hours after the reactor is subcritical between October 15th through May 15th.

The Nuclear Regulatory Commission (NRC or the Commission) staff has reviewed the information the licensee provided that supports the proposed amendment and would like to discuss the following issues to clarify the submittal.

1. The NRC staff estimates that the proposed reduction in decay time increases the spent fuel pool (SFP) decay heat level by 10 percent. Past communication on related amendment requests has indicated the NRC staff's concern with the quality of the modeling used to predict SFP temperature response, the reliability of the fuel building ventilation system at high SFP temperatures, and the reliability of the operators completing repeated transfers of a single cooling train between SFPs following the design-basis loss of a single heat exchanger. The staff has accepted some of the related amendment requests based, in part, on the margin provided by lower decay heat or increased cooling capability overcoming the uncertainties associated with these issues. The staff concludes that the proposed amendment would eliminate much of the margin and increase the probability of the SFP water temperature approaching the design basis limit of 180 °F. Accordingly, please provide the following information:

    a) Data validating the CROSSTIE model for evaporative cooling during SFP temperature excursions exceeding 150 °F and approaching 180 °F, such as by benchmarking model predictions to test pools at similar temperatures.

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1 The current TS decay time requirement of 100 hours is applicable through the year 2010. After 2010, the 168 hour decay time requirement would be applicable for refueling outages occurring between October 15th and May15th. On March 5, 2008, the NRC approved a one-time change for Salem Unit No.2 (Amendment No. 271) which revised TS 3/4.9.3 to allow fuel movement to commence at 86 hours after the reactor is subcritical for refueling outage 2R16 (spring 2008 outage).

b) Data demonstrating by test or detailed analysis that the ventilation system will maintain performance consistent with that assumed in the CROSSTIE model at SFP temperatures approaching 180 °F.

Alternatively, propose a modification to the SFP cooling system to enhance the reliability of the system in providing forced cooling to two SFPs simultaneously.

2. The license amendment request states that the integrated decay heat management (IDHM) program would be used to calculate a maximum allowable component cooling water (CCW) temperature for each outage, which is required to be procedurally verified prior to the start of core offload. The amendment request includes the statement that analysis and controls in place will ensure the capability of the SFP cooling system to (1) maintain both Salem pools below 149 °F with two SFP heat exchangers available and (2) maintain both pools below 180 °F with only one heat exchanger available. However, Calculation S-C-SF-MDC-1810, Revision 8, "Decay Heat-up Rates and Curves," provides information related to the required time to switch cooling between SFPs that is not bounding. This calculation considers conditions based on expected SFP inventories for future spring and fall outages beginning on April 15 and October 15, respectively. Actual refueling outages could allow much less than six months decay for the most recent refueling batch, which would increase the heat load in the non-outage SFP relative to the heat load used in the calculation.

   Explain the criteria that apply to the IDHM program evaluation when determining that both SFPs could be maintained below 180 °F with only one heat exchanger available and the basis for the criteria.

3. Define the key methods and assumptions of the IDHM program in making the determination that the SFP cooling system would have the capability to (1) maintain both Salem pools below 149 °F with two SFP heat exchangers available and (2) maintain both pools below 180 °F with only one heat exchanger available. At a minimum, the method of determining decay heat for a given fuel inventory, the method of calculating SFP heat exchanger performance, and the method of calculating heat losses to the environment (i.e., pool structure and fuel building atmosphere) should be defined.