January 22, 2004

Mr. Roy A. Anderson
President & Chief Nuclear Officer
PSEG Nuclear, LLC - X04
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 1, REQUEST FOR ADDITIONAL INFORMATION RE: ORDER EA-03-009, REACTOR PRESSURE VESSEL INSPECTIONS (TAC NO. MC0967)

Dear Mr. Anderson:

On February 11, 2003, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-03-009 requiring specific inspections of the reactor pressure vessel (RPV) head and associated penetration nozzles at pressurized water reactors. The NRC issued an errata to the Order on March 14, 2003, to correct administrative procedures relating to requests for relaxation of the Order's technical requirements.

By letter dated September 24, 2003, PSEG Nuclear LLC (PSEG) requested relaxation from the requirements in Section IV.C(1)(b) of the Order, pursuant to the procedure specified in Section IV.F of the Order. Specifically, for inspection of the RPV control element drive mechanism penetration nozzles, PSEG requested authorization to use ultrasonic testing on the nozzle base material, and reduced examination coverage below the weld in the non-pressure boundary portion of the nozzle.

The NRC staff is reviewing your request, and has determined that additional information is necessary in order to complete its evaluation. We discussed the enclosed request for additional information (RAI), via telephone, with your staff on January 9, 2004. During this call, PSEG agreed to respond to the enclosed RAI within 45 days from the date of this letter. If circumstances result in the need to revise the target date, please contact me at (301) 415-1324.

Sincerely,

/RA/

Robert J. Fretz, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-272

Enclosure: As stated

cc w/encl: See next page

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Salem Nuclear Generating Station, Unit No. 1

cc:

Mr. A. Christopher Bakken, III
Senior Vice President - Site Operations
PSEG Nuclear - X15
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. John T. Carlin
Vice President - Nuclear Assessments
PSEG Nuclear - N10
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. David F. Garchow
Vice President - Eng/Tech Support
PSEG Nuclear - N28
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. Steven Mannon
Acting Manager - Licensing
PSEG Nuclear - N21
P.O. Box 236
Hancocks Bridge, NJ 08038

Jeffrie J. Keenan, Esquire
PSEG Nuclear - N21
P.O. Box 236
Hancocks Bridge, NJ 08038

Ms. R. A. Kankus
Joint Owner Affairs
PECO Energy Company
Nuclear Group Headquarters KSA1-E
200 Exelon Way
Kennett Square, PA 19348

Lower Alloways Creek Township
c/o Mary O. Henderson, Clerk
Municipal Building, P.O. Box 157
Hancocks Bridge, NJ 08038

Dr. Jill Lipoti, Asst. Director
Radiation Protection Programs
NJ Department of Environmental
Protection and Energy
CN 415
Trenton, NJ 08625-0415

Brian Beam
Board of Public Utilities
2 Gateway Center, Tenth Floor
Newark, NJ 07102

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Salem Nuclear Generating Station
U.S. Nuclear Regulatory Commission
Drawer 0509
Hancocks Bridge, NJ 08038

REQUEST FOR ADDITIONAL INFORMATION

RELATED TO REQUEST FOR

RELAXATION OF THE REQUIREMENTS OF ORDER EA-03-009 REGARDING

REACTOR PRESSURE VESSEL HEAD INSPECTIONS AT

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-272

On February 11, 2003, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-03-009 requiring specific inspections of the reactor pressure vessel (RPV) head and associated penetration nozzles at pressurized water reactors. The NRC issued an errata to the Order on March 14, 2003, to correct administrative procedures relating to requests for relaxation of the Order's technical requirements. Section IV.F of the Order states that requests for relaxation associated with specific penetration nozzles will be evaluated by the NRC staff using its procedure for evaluating proposed alternatives to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) in accordance with Section 50.55a(a)(3) of Title 10 of the *Code of Federal Regulations*.

Sections IV.A and IV.B of the Order provide criteria to categorize each plant's RPV head with respect to its susceptibility to primary water stress corrosion cracking (PWSCC). For plants such as Salem Nuclear Generating Station (Salem), Unit No. 1, with RPV heads that are categorized as being highly susceptible to PWSCC, Section IV.C(1)(b) of the Order requires that the RPV head penetration nozzles be inspected each refueling outage using either of the following techniques: (1) ultrasonic testing (UT) from two inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred in the interference fit zone, or (2) eddy current testing or dye penetrant testing of the wetted surface of each J-groove weld and nozzle base material to at least two inches above the J-groove weld.

By letter dated September 24, 2003, PSEG Nuclear LLC (licensee) requested relaxation from the requirements in Section IV.C(1)(b) of the Order for Salem, Unit No. 1. The relaxation request was made pursuant to the procedure specified in Section IV.F of the Order. Specifically, for inspection of the RPV control element drive mechanism (CEDM) penetration nozzles, the licensee requested authorization to use UT on the nozzle base material, and reduced examination coverage below the weld in the non-pressure boundary portion of the nozzle.

The NRC staff has reviewed the information the licensee provided that supports the proposed relief request and requires the following information to clarify the submittal. The staff notes that, due to the limited information provided in the initial submittal, additional questions may be necessary.

1. What penetration nozzles are to be covered by this relaxation request (RPV head vent, instrument, CEDM, etc.)? Provide the number and type of penetrations.

2. Provide drawing(s) of the nozzle design and head configurations.

3. Provide cross section drawings showing limitations of the UT examinations (nozzle design and test equipment). What is the expected examination volume for the different nozzle angles and designs?

4. Provide a cross sectional figure of the head and penetrations showing how far each penetration protrudes below the bottom surface of the head using as-built dimensions and considering the UT results from the last inspection (if any). Are there any photos from the last or previous outages? If so, provide any photos that show how far the penetrations protrude below the head.

5. What is the minimum distance from the bottom of the weld to the point where examination data will not be acquired in the lower portion of the nozzle?

6. Describe previous examinations performed on the vessel head and nozzles. Discuss what probes were used, and how any indications were dispositioned. Also, discuss how the UT was qualified.

7. Provide the heat numbers for the RPV head penetration nozzles, and any industry inspection history.

8. The request states that "UT of the most highly stressed portion of the nozzle (the weld heat affected zone) is unaffected by this limitation." Provide tabular listings or graphs of the maximum stresses in the cross-section from the top of the J-groove weld region to the nozzle end for a range of nozzle angles.

9. Provide a technical justification, such as an analysis or an evaluation, to show that cracks initiated from the unexamined area will not propagate into the pressure boundary and exceed the ASME Code allowable crack sizes within a minimum of one operating cycle using a conservative crack-growth rate from industry experience. Describe uncertainties in this calculation (e.g., stress levels, crack-growth rate, etc.) and the uncertainty in the results.

10. Does the structural integrity evaluation described in your answer to question number 9 use the crack-growth formula in industry report MRP-55? The staff has not made a determination on the subject industry report. Therefore, if using MRP-55, PSEG must agree to and document the following condition:

> If the NRC staff finds that the crack-growth formula in industry report MRP-55 is unacceptable, the licensee shall revise its analysis that justifies relaxation of the Order within 30 days after the NRC informs the licensee of an NRC-approved crack-growth formula. If the licensee's revised analysis shows that the crack-growth acceptance criteria are exceeded prior to the end of the current operating cycle, this relaxation is rescinded and the licensee shall, within 72 hours, submit to the NRC written justification for continued operation. If the revised analysis shows that the crack-growth acceptance criteria are exceeded during the subsequent operating cycle, the licensee shall, within 30 days, submit the

revised analysis for NRC review. If the revised analysis shows that the crack-growth acceptance criteria are not exceeded during either the current operating cycle or the subsequent operating cycle, the licensee shall, within 30 days, submit a letter to the NRC confirming that its analysis has been revised. Any future crack-growth analyses performed for this and future cycles for RPV head penetrations must be based on an acceptable crack-growth rate formula.