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AUG 20 2004

LR-N04-0359



U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR LCR-S02-10
REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS
RELAXATION OF REQUIREMENTS APPLICABLE DURING
MOVEMENT OF IRRADIATED FUEL
SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSES DPR-70 and DPR-75
DOCKET NOS. 50-272 AND 50-311**

By letter dated July 29, 2002, PSEG Nuclear submitted a proposed amendment to the Technical Specifications for Salem Nuclear Generating Station, Units 1 and 2. The proposed amendment would revise the Technical Specifications based on a re-analysis of the design basis Fuel Handling Accident (FHA) following the guidance of Regulatory Guide 1.183. Additional information was also provided to NRC by PSEG letter dated May 1, 2003 (LR-N03-0136). By letter dated July 16, 2004 the Nuclear Regulatory Commission staff requested additional information to complete their review. This letter provides PSEG's response to the requested information.

No changes to the No Significant Hazards Analysis were made and the No Significant Hazards Analysis conclusions remain unchanged.

In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

If you have any questions or require additional information, please contact Mr. Courtney Smyth at (856) 339-5298.

A 001

AUG 20 2004

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 8/20/04
(Date)

Sincerely,



Michael H. Brothers
Vice President - Site Operations

Attachments (1)

C: Mr. S. Collins, Administrator – Region I
U. S. Nuclear Regulatory Commission
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King of Prussia, PA 19406

Mr. D. Collins, Project Manager - Salem & Hope Creek
U. S. Nuclear Regulatory Commission
Mail Stop 08C2
Washington, DC 20555

USNRC Senior Resident Inspector – Salem (X24)

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
PO Box 415
Trenton, New Jersey 08625

NRC Request for Information:

By letter dated July 29, 2002, PSEG Nuclear (the licensee) submitted a proposed amendment to the Technical Specifications for Salem Nuclear Generating Station, Units 1 and 2. The proposed amendment would revise the Technical Specifications based on a re-analysis of the design basis Fuel Handling Accident (FHA).

The Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed Technical Specification changes. In order for the staff to complete its evaluation, the following additional information is requested:

1. The proposed Technical Specification change proposes changing the definition of CORE ALTERATIONS. As a result of the proposed change the applicability section of several technical specifications are proposed to be changed. The applicability is changed from: "During CORE ALTERATIONS or movement of irradiated fuel within the containment" to "During movement of irradiated fuel within the containment."

IN 90-77, "Inadvertent Removal of Fuel Assemblies from the Reactor Core," discusses events during removal of upper guide structures and upper internals. During these events fuel assemblies were inadvertently removed from the reactor creating the high potential for a fuel handling accident.

A review of the Salem licensing bases in UFSAR Section 15.4.6.1¹ does not specify how the spent fuel assembly is dropped inside of containment.

CORE ALTERATIONS, as presently defined in the Technical Specifications, is the movement or manipulation of any component within the reactor pressure vessel with the vessel head removed and fuel in the vessel. This definition would bound inadvertent movement of a single fuel assembly.

The combination of the proposed change in the definition of CORE ALTERATIONS and applicability statements appear to not bound the known potential for inadvertent movement of fuel assemblies. In light of these considerations please justify why the proposed technical specification change should not include applicability for a fuel handling accident occurring during the movement of other core components.

¹ The Salem UFSAR Section 15.4.6.1 states:

"The accident is defined as dropping of a spent fuel assembly onto the spent fuel pit floor in the fuel handling building or inside containment resulting in the rupture of the cladding of all the fuel rods in the assembly despite many administrative controls and physical limitations imposed on fuel handling operations. All refueling operations are conducted in accordance with prescribed procedures under direct surveillance of a supervisor."

PSEG Response:

The dose analysis approved as part of License Amendments 251 & 232 is independent of the manner in which a fuel bundle is dropped. Therefore, the analysis bounds the inadvertent removal of fuel assemblies from the reactor core. In addition, the control room ventilation system required to address this event is required to be operable in all modes (the plant would be in Mode 6 during upper internals removal). Also the proposed BASES state

"Either the Containment Purge system or the Auxiliary Building Ventilation System with suction from the containment atmosphere, with associated radiation monitoring will be available whenever movement of irradiated fuel is in progress in the containment building and the equipment hatch is open. If for any reason, this ventilation requirement can not be met, movement of fuel assemblies within the containment building shall be discontinued until the flow path(s) can be reestablished or close the equipment hatch and personnel airlocks."

The present definition of CORE ALTERATION is overly conservative, in that even movement of small components with no potential for causing a Fuel Handling Accident or damage would be considered a CORE ALTERATION. The proposed definition is reasonable. However, to address IN 90-77, procedure SC.MD-FR.FH-0011(Q), "Reactor Vessel Upper Internals Removal and Inspection", has specific visual checks that are performed to verify that no fuel assemblies are inadvertently lifted during upper internals removal in accordance with procedure. Copies of the relevant portions of this procedure are attached.

The proposed changes are also consistent with Improved TS (NUREG 1431 Rev. 3). Similar changes have been previously approved for other plants including Turkey Point (Amendments 216/210 TAC NOS. MB2410 & MB2411) and Catawba (Amendments 198/191 TAC NOS. MB3759 & MB3760).

2. **Proposed Technical Specification 3.9.4 proposes the following: "The equipment hatch inside door is capable of being closed and held in place by a minimum of four bolts, or an equivalent closure device installed and capable of being closed." Please define what criteria are used to determine whether a device is an equivalent closure device to the equipment hatch. Please define the devices to be used.**

PSEG Response:

An equivalent closure device would meet the requirements of Technical Specification 3/4.9.4.a as defined in the Technical Specifications 3/4.9.4 Bases. The equivalent closure device must meet the above technical specification requirements of providing "containment closure" rather than "containment OPERABILITY" as discussed in the above Bases. Closure restrictions must be sufficient to provide an atmospheric ventilation barrier to restrict radioactive material released from a fuel handling accident. Equivalent closure device design criteria are noted in the NRC Safety Evaluation (SE) for Salem Amendments 217 and 199, "The design and fabrication of the equivalent device will be governed by ASME Boiler and Pressure Vessel Code, Section III for Class B Vessels 1968." The SE also notes, "Since pressurization events are unlikely during MODE 6 (refueling) operation, the closure requirement for the equivalent device need only be sufficient to provide an atmospheric ventilation barrier to restrict radioactive material released from a fuel element rupture during refueling operation." The only closure devices currently defined are the Outage Equipment Hatch and the Inner Equipment Hatch. However, other devices could be used that meet the above criteria.

3. The staff has reviewed Salem's May 1, 2003 response (LR-N03-0136) to the staff's request for additional information related to the proposed license amendment. The response to question 5 does not appear to be responsive to the staff's question. Please describe the outage activities that could prevent the establishment of fuel handling building closure and the compensatory actions that would need to be taken. It would also be helpful for the staff to understand that in the event of a fuel handling accident that the fuel building would be closed promptly (or within a reasonable time frame) to limit the release of radioactivity.

PSEG Response:

It is PSEG's intention to maintain the Fuel Handling Building (FHB) door closed during fuel movement in the FHB, except for off-normal or plant modification conditions that necessitate the opening of the door during fuel movement. As stated in the PSEG July 29, 2002 License Change Request (LCR S02-010) at page 6 of Attachment 1, the Fuel Handling Building doors shall be maintained closed except for normal entry and exit unless a designated person is available to close the open door(s) should a FHA occur within the Fuel Handling Building. An activity that could prevent the establishment of fuel handling building closure might be installing a through-wall penetration for piping (The Containment Fan Coil Unit Project piping installation described in LCR S03-07 LR-N04-0089, dated April 15, 2004 is an example). In this case, fuel handling could be terminated or compensatory actions established with designated persons available to promptly carry out a pre-planned task. These compensatory measures may include the use of a material that can provide a temporary atmospheric pressure, ventilation barrier such as providing a temporary ventilation cover for the opening. In the event of a fuel handling accident, the FHB door would be closed promptly based on Administrative Controls described in the proposed Technical Specification 3/4.9, Refueling Operations, BASES.

4. Per page 6 of the July 29, 2002 amendment request, the ability to close the Salem equipment hatch is dependent on AC power. In the case of a loss of AC power coincident with a fuel handling accident, electrical power may not be available for closing the hatch. Please explain what measures are in place to promptly close the equipment hatch without AC power. NUREG-1449² also states that with four bolts installed that the Salem equipment hatch had gaps between the equipment hatch seals. How many bolts will be needed to close the equipment hatch to prevent the release of radioactivity?

² NUREG-1449, "Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States," page B-5.

PSEG Response:

The refueling equipment is powered from offsite power, and in the case of a loss of AC power fuel handling would be terminated. The case of a loss of AC power coincident with a FHA, is unlikely since there is no reason that a FHA would cause a loss of AC power and the refueling equipment fails safe on loss of power. In addition, the approved dose analysis does not credit containment closure (See the PSEG July 29, 2002 License Change Request (LCR S02-010) at page 3 of Attachment 1, DOSE CALCULATIONS). Prompt containment

6. **Provide the criterion used to decide if the containment personnel airlock and the containment equipment hatch are capable of being closed within 1 hour.**

PSEG Response:

The Containment Building Closure on Page 5 and 6 of the PSEG July 29, 2002 License Change Request (LCR S02-010), describes the methods to assure that the containment closure will be accomplished within 1 hour. The plant has already demonstrated this 1-hour closure capability for the Outage Equipment Hatch for support of operation at mid-loop (Procedure SC.MD-FR.CAN-0001(Q), "Outage Equipment Hatch Installation, Removal, Seal Replacement and Door Manipulation for Containment Closure"). Administrative Controls discussed in Technical Specifications 3/4.9.4 Bases will be in place and similar demonstrations will be conducted for fuel handling with the Equipment Hatch (or other closure when the Outage Equipment Hatch is not used). The procedure(s) will specify that a containment closure team will be designated and should not perform job functions that may interfere with a team members' ability to immediately respond for containment closure.

Page 5 and 6 of the PSEG July 29, 2002 License Change Request (LCR S02-010), describes the conditions that must be met prior to fuel movement with the hatch open. If these conditions are not met fuel movement could continue only with the equipment and personnel hatches closed. The above noted section states, "The following requirements shall be maintained to ensure defense-in-depth".

7. **What criteria will be used to determine if closure of the containment is necessary in the event of adverse weather? Has the impact of wind on fuel handling been evaluated (for example, reduced pool visibility due to pool surface disruption)? What steps would be taken in the event of severe weather to minimize the impact of flying debris or missile hazards?**

² NUREG-1449, "Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States," page B-5.

PSEG Response:

The site procedures for severe weather, NC.OP-DG.ZZ-0001, "Severe Weather Guide" and SC.OP-AB.ZZ-0001, "Adverse Environmental Conditions", will be used for criteria to determine if containment closure is required. These procedures are based on severe weather advisories or bulletins and actual measured site weather conditions. Discontinuing fuel movement is currently addressed in procedure SC.OP-AB.ZZ-0001 (Steps 3.4 & 3.7, copies of procedure steps attached) if adverse weather conditions occur. The procedure will be revised to more explicitly address containment closure as part of the implementation of the amendment approving this License Change Request.

8. **Will your Emergency Plan be updated to include an accident release through the equipment hatch? Will your Emergency Operating Procedures be updated to address the specific details needed to respond to this accident scenario?**

PSEG Response:

The Emergency Plan and implementing procedures address fuel handling events regardless of the manner in which they occur. Therefore, no Emergency Plan or implementing procedure changes are needed. However, plant procedures will be revised as needed to address containment closure within one hour in order to respond to any fuel handling event.

9. **Will you inform the State Emergency Response personnel about this accident scenario?**

PSEG Response:

The State Emergency Planning personnel in New Jersey are aware of this amendment request since they receive copies of the License Change Request and any responses to requests for additional information. In addition this License Change Request has been discussed during interface meetings with the New Jersey Department of Environmental Protection Bureau of Nuclear Engineering. The State Emergency Planning personnel in Delaware will be notified of the amendment when it is approved.

10. **The proposed technical specification specifies that a "designated" crew is available to close the Containment Structure Equipment Hatch Shield Doors rather than a "dedicated" crew who would have no other duties. Specify what other duties the designated crew will have and where they will be stationed relative to the air lock doors.**

PSEG Response:

The plant has established procedures for a 1-hour closure capability when the Outage Equipment Hatch (OEH) is installed in support of Mid-Loop Operations in procedures S1(S2).OP-AB.CONT-0001, "Containment Closure Abnormal Procedure" and SC.MD-FR.CAN-0001, "Outage Equipment Hatch Installation, Removal, Seal Replacement and Door Manipulation for Containment Closure". The designated OEH Door Closure Team has defined team capabilities, responsibilities, pre-staged equipment, and is limited in their other job functions that may interfere with team members IMMEDIATELY responding for door closure (SC.MD-FR.CAN-0001, Step 5.5.3 CAUTION and Step 5.6 NOTE, copies attached). As part of the implementation of the amendment approving this License Change Request, the Administrative Controls discussed in Technical Specifications 3/4.9.4 Bases will be implemented and similar demonstrations will be conducted to support fuel handling administrative controls with the Equipment Hatch (or other closure device when the Outage Equipment Hatch is not used) open. The duties of the personnel designated to close the hatches will take into consideration the need to promptly (within one hour) close the containment hatch. With the pre-staging of tools and equipment to support hatch closure and in accordance with the administrative controls described in PSEG's submittal, Hatch closure will be achieved within one hour.

CAUTION

As Internals are lifted out of or inserted into the vessel, weight is expected to increase/decrease due to buoyancy depending on how much of the internals is above the water level. If unexpected weight increases or decreases are experienced stop operation until cause can be determined and corrected, Monitor load cell for any deviations from normal readings while raising, lowering or transporting Internals package.

— 5.2.16 If required, PERFORM remaining special lifting device inspection IAW SC.MD-EU.CRN-0002(Q), Special Lifting Devices. **RECORD** completion of inspection on Attachment 5.

— 5.2.17 CLEAR area of refueling cavity of all nonessential personnel prior to lifting upper internals.

— 5.2.18 Supervisor Notification

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Continue to RAISE upper internals until it is clear of reactor vessel by 12-24 in. **RECORD** on Attachment 5.

NOTE

Temporary lights may be placed on outside of reactor approximately 180° away from camera to enhance viewing.

— 5.2.19 PERFORM a video inspection to ensure NO core components are attached to upper internals. This step is NOT applicable if NO fuel is in reactor.

— A. If fuel assemblies or fuel inserts can be seen attached to the upper internals, stop lift with NO FURTHER MOVEMENT until corrective action has been planned.

— 1. SECURE crane in a safe condition.

— 2. NOTIFY Operations immediately of conditions and initiate containment evacuation. Controlled re-entries by Operations and Radiation Protection personnel will be allowed as required to perform emergency or monitoring requirements.

___ 3.4 IF AT ANY TIME river level is ≥ 99.5 feet (10.5 ft. above Mean Sea Level),
THEN:

- ___ A. NOTIFY SM/CRS to refer to Event Classification Guide.
- ___ B. RECORD river level in Control Room Narrative Log, at least every 2 hours, until river has stabilized at < 99.5 feet (10.5 ft. above Mean Sea Level).

NOTE

Doors, hatches or manway covers which are taken credit for in the UFSAR watertight externa (flood barriers below the design basis flood height of 120.4 feet) are identified with Technical Specifications 3.7.5.1/3.7.5 in Attachment 2, Technical Specification Protective Doors. These doors, hatches or manway covers should be given priority for closure within 2 hours per Technical Specification 3.7.5.1/3.7.5.

- ___ C. Send Operators to CLOSE all doors listed in Attachment 2, Technical Specification Protective Doors, within two hours. [C0365]
 - ___ D. IF Containment Equipment Hatch is OPEN,
THEN:
 - ___ 1. REMOVE obstructions from inner Containment Equipment Hatch,
AND INSTALL inner Containment Equipment Hatch with ALL bolts to eliminate air gaps.

OR
 - ___ 2. INSTALL Outage Equipment Hatch IAW SC.MD-FR.CAN-0001(Q),
Outage Equipment Hatch Installation, Removal, and Seal Replacement
AND ENSURE all penetrations are closed or Blind Flanged to eliminate air gaps.
 - ___ E. Send Maintenance Service Department to CLOSE AND SEAL all access hatches and manway covers listed on Attachment 3, Protective Doors.
 - ___ F. Send Operators to CLOSE all doors listed in Attachment 3, Protective Doors.
- ___ 3.5 IF AT ANY TIME the river level is ≥ 100.5 ft (11.5 ft. above Mean Sea Level),
THEN INITIATE actions to place the Unit in Mode 3 within 6 hours and in Mode 5 within the next 30 hours.

3.6 IF excessive air temperatures (<32°F / >95°F) are expected,
THEN:

A. IF Extreme High air temperatures are forecast for the area,
THEN REVIEW SC.OP-PT.ZZ-0002(Q), Station Preparations for
Seasonal Conditions, section for Extreme Heat Conditions.

B. IF Extreme Cold air temperatures are forecast for the area,
THEN REVIEW SC.OP-PT.ZZ-0002(Q), Station Preparations for
Seasonal Conditions, section for Extreme Cold Conditions.

C. GO TO Section 4.0.

3.7 IF AT ANY TIME adverse weather is observed or expected in the form
of high winds or excessive precipitation including snowfall >12 inches,
THEN:

Time

A. IF fuel movement is in progress,
THEN EVALUATE termination of all fuel movement and securing fuel
handling equipment based on forecast, expected conditions and core load status,
and DOCUMENT in Comments Section of Attachment 5.

NOTE

National Weather Service Information

- ◆ A Tornado Watch - atmospheric conditions are such that a Tornado may form
- ◆ A Tornado Warning - an actual Tornado has been observed in the vicinity
- ◆ A Hurricane Watch - named storm, > 74 mph winds, arrival in the next 24 - 48
hours with expected land fall within 100 miles of Site
- ◆ A Hurricane Warning - named storm, > 74 mph winds, arrival in the next 24 hours
with expected land fall within 50 miles of Site

B. IF a hurricane, tornado, high winds or snowstorm is anticipated,
THEN prior to arrival of storm:

1. Notify SM/CRS to REFER to Event Classification Guide.
2. Send Operations personnel to INSPECT the Shoreline Protection and
Dike System for indications of erosion or other degradation, and
ENSURE the Service Water Intake Structure Access Hatches are
installed.
3. NOTIFY Electric System Operator of Severe Weather Conditions.

(step continued on next page)

5.5 OEH Door Opening After Initial Installation and Mid-Loop Operation

NOTE

Consider existing/projected weather conditions (snow, rain, high wind) before opening door.

- 5.5.1 NOTIFY SM/CRS, Containment Coordinator, Radiation Protection and Security that OEH door will be opened.
- 5.5.2 REQUEST SM/CRS to verify conditions for containment closure are NOT required and it is ok to open OEH Door. **Record on Attachment 10.**
- 5.5.3 VERIFY one set of air-lock doors are open. [PR#990511243]

CAUTION

During Mid-Loop Operations, the OEH Door closure team should consist of four Tractor Operators, one hoist Operator and one torque qualified technician. One of these persons will be established as team leader.

The team leader will notify the SM/CRS and Containment Coordinator whenever the team leader changes. (i.e. shift change).

The closure team should **NOT** perform other job functions that may interfere with that person **IMMEDIATELY** responding for door closure.

- 5.5.4 IF door is to be open for Mid-Loop Operation, VERIFY the following:
 - ♦ Obstructions that could affect door closure within 1 hour are clear of door closure path.
 - ♦ Equipment necessary for door closure is prestaged.
 - ♦ An OEH door closure team is in place ready to close the door.
 - ♦ SM/CRS, Containment Coordinator, Radiation Protection, notified of who the team lead will be for door closure.
 - ♦ Appropriate communications system is in place to provide communication between the Control Room and the OEH door closure team leader.

NOTE

When door is opened, time and date should be entered on Attachment 8.

CAUTION

Care should be taken when opening OEH door due to potential difference between pressure inside and outside containment. One set of air-lock doors should be open prior to opening OEH door. [PR#990511243]

— 5.5.5 UNLATCH door and SWING full open. Record on Attachment 8.

— 5.5.6 INSTALL seismic support. (If necessary, Refer to PSBP 324208, Trentec Dwg. 31803)

— 5.5.7 IF required, INSTALL floor ramps.

5.6 Securing Door For Containment Closure During Mid-Loop Operations

NOTE

The minimum requirements for the OEH Door being opened during Mid-Loop are:

Personnel -The OEH Door closure team should consist of four Tractor Operators, one Hoist Operator and one torque qualified technician. One of these persons will be established as team leader.

Prestaged equipment - Spare swing bolts and nuts, appropriate sized wrenches, 2 Torque wrenches capable of 300 ft. lbs., forklift with man basket, torque qualified technician, Hoist Operator (if Sea-Van is on pedestal), proper Personal Protective Equipment (i.e. fall protection), communication equipment.

CAUTION

The door is required to be closed within 1 hour of notification.

— 5.6.1 REMOVE seismic support. .

— 5.6.2 Gently SWING door closed, VERIFYING proper alignment.

— 5.6.3 IF door CANNOT be pushed closed due to air pressure, immediately NOTIFY SM/CRS and Containment Coordinator.