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United States Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

**CORRECTION OF BASES PAGES ISSUED WITH AMENDMENTS 251 AND 232  
SALEM GENERATING STATION  
UNIT NOS. 1 AND 2  
FACILITY OPERATING LICENSE NOS. DPR-70 AND DPR-75  
DOCKET NOS. 50-272 AND 50-311**

On October 10, 2002, the NRC issued Amendments 251 and 232 for Salem Units 1 and 2, respectively. These amendments revised the fuel decay time at Salem. In the original amendment request submitted on June 28, 2002, PSEG Nuclear included changes to Bases section 3/4.9.3. The marked-up pages provided in this submittal had identified the changes to Bases section 3/4.9.3 as being contained on page B3/4 9-3 instead of page B3/4 9-1. As a result of this error, the Bases pages issued with Amendment 251 and 232 included instructions to remove and replace bases page B3/4 9-3 instead of page B3/4 9-1. In addition, the revised page included a substantial amount of new information that was inserted into the page, however, the existing information that was contained on the page was not moved to the next page. This submittal corrects the Bases pages issued with Amendments 251 and 232. To ensure that all copies of the Salem Unit 1 and Unit 2 Technical Specifications are completely corrected, attachments 1 and 2 of this submittal include all pages of Bases section 3/4.9 with the corrections identified above.

If you have any questions concerning this submittal please contact Brian Thomas at 856-339-2022.

Sincerely,

*T. K. Carrin (for G. Salamon)*

G. Salamon  
Nuclear Safety and Licensing Manager

Attachments (2)

A001

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Attachment 1

LR-N03-0126

Corrected Bases Pages

Salem Unit 1

Section B 3/4.9

## 3/4.9 REFUELING OPERATIONS

### BASES

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#### 3/4.9.1 BORON CONCENTRATION

The limitations on minimum boron concentration (2000 ppm) ensure that: 1) the reactor will remain subcritical during CORE ALTERATIONS, and 2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. The limitation on  $K_{eff}$  of no greater than 0.95 which includes a conservative allowance for uncertainties, is sufficient to prevent reactor criticality during refueling operations.

The sampling and analysis required by surveillance requirement 4.9.1.2 ensures the boron concentration required by Limiting Condition of Operation 3.9.1 is met. Sampling and analysis of the refueling canal is required if water exists in the refueling canal, regardless of the amount.

#### 3/4.9.2 INSTRUMENTATION

The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

#### 3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short lived fission products. The 100-hour decay time is consistent with the assumptions used in the fuel handling accident analyses and the resulting dose calculations using the Alternative Source Term described in Reg. Guide 1.183.

The minimum requirement for reactor subcriticality also ensures that the decay time is consistent with that assumed in the Spent Fuel Pool cooling analysis. Delaware River water average temperature between October 15<sup>th</sup> and May 15<sup>th</sup> is determined from historical data taken over 30 years. The use of 30 years of data to select maximum temperature is consistent with Reg. Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants".

A core offload has the potential to occur during both applicability time frames. In order not to exceed the analyzed Spent Fuel Pool cooling capability to maintain the water temperature below 180°F, two decay time limits are provided. In addition, PSEG has developed and implemented a Spent Fuel Pool Integrated Decay Heat Management Program as part of the Salem Outage Risk Assessment. This program requires a pre-outage assessment of the Spent Fuel Pool heat loads and heatup rates to assure available Spent Fuel Pool cooling capability prior to offloading fuel.

#### 3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment the requirements for containment building penetration closure and OPERABILITY ensure that a release of fission product radioactivity within containment will be restricted from leaking to the environment. In MODE 6, the potential for containment pressurization as a result of an accident is not likely. Therefore, the requirements to isolate the containment from the outside atmosphere can be less stringent. The LCO requirements during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment are referred to as "containment closure" rather than containment OPERABILITY. For the containment to be OPERABLE, CONTAINMENT INTEGRITY must be maintained. Containment closure means that all potential release paths are closed or capable of being closed. Closure restrictions must be sufficient to provide an atmospheric ventilation barrier to restrict radioactive material released from a fuel element rupture during refueling operations.

## REFUELING OPERATIONS

### BASES

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The containment serves to limit the fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained well within the requirements of 10CFR100. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The Containment Equipment Hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into or out of containment. During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the Containment Equipment Hatch inside door must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by the LCO are approximately equally spaced.

An equivalent closure device may be installed as an alternative to installing the Containment Equipment Hatch inside door with a minimum of four bolts. Such a closure device may provide penetrations for temporary services used to support maintenance activities inside containment at times when containment closure is required; and may be installed in place of the Containment Equipment Hatch inside door or outside door. Penetrations incorporated into the design of an equivalent closure device will be considered a part of the containment boundary and as such will be subject to the requirements of Technical Specification 3/4.9.4. Any equivalent closure device used to satisfy the requirements of Technical Specification 3/4.9.4.a will be designed, fabricated, installed, tested, and utilized in accordance with established procedures to ensure that the design requirements for the mitigation of a fuel handling accident during refueling operations are met.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during operation in MODES 1, 2, 3, and 4 as specified in LCO 3.6.1.3, "Containment Air Locks". Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown, when containment closure is not required and frequent containment entry is necessary, the air lock interlock mechanism may be disabled. This allows both doors of an airlock to remain open for extended periods. During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain closed.

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by an OPERABLE automatic isolation valve, or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods may include the use of a material that can provide a temporary atmospheric pressure, ventilation barrier. Any equivalent method used to satisfy the requirements of Technical Specification 3/4.9.4.c.1 will be designed, fabricated, installed, tested, and utilized in accordance with established procedures to ensure that the design requirements for the mitigation of a fuel handling accident during refueling operations are met.

REFUELING OPERATIONS  
BASES

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3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

3/4.9.6 MANIPULATOR CRANE

The OPERABILITY requirements for the manipulator cranes ensure that: 1) manipulator cranes will be used for movement of control rods and fuel assemblies, 2) each crane has sufficient load capacity to lift a control rod or fuel assembly, and 3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel and control rod assembly and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirements that at least one residual heat removal loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification. A minimum flow rate of 1000 gpm is required. Additional flow limitations are specified in plant procedures, with the design basis documented in the Salem UFSAR. These flow limitations address the concerns related to vortexing and air entrapment in the Residual Heat Removal system, and provide operational flexibility by adjusting the flow limitations based on time after shutdown. The requirement to have two RHR loops OPERABLE when there is less than 23 feet of water above the reactor vessel flange ensures that a single failure of the operating RHR loop will not result in a complete loss of residual heat removal capability.

For support systems: Service Water (SW) and Component Cooling (CC), component redundancy is necessary to ensure no single active component failure will cause the loss of Decay Heat Removal. One piping path of SW and CC is adequate when it supports both RHR loops. The support systems needed before entering into the desired configuration (e.g., one service water loop out for maintenance in Modes 5 and 6) are controlled by procedures, and include the following:

- A requirement that the two RHR, two CC and two SW pumps, powered from two different vital buses be kept operable

## REFUELING OPERATIONS

### BASES

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• A listing of the active (air/motor operated) valves in the affected flow path to be locked open or disabled.

Note that four filled reactor coolant loops, with at least two steam generators with at least their secondary side water level greater than or equal to 5% (narrow range), may be substituted for one residual heat removal loop. This ensures that a single failure does not cause a loss of decay heat removal.

With the reactor vessel head removed and 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

#### 3/4.9.9 CONTAINMENT PURGE AND PRESSURE-VACUUM RELIEF ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

#### 3/4.9.10 and 3/4/9/11 WATER LEVEL - REACTOR VESSEL AND STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

#### 3/4.9.12 FUEL HANDLING AREA VENTILATION SYSTEM

The limitations on the fuel handling area ventilation system ensure that all radioactive material released from a dropped irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The OPERABILITY of this system is consistent with the assumptions of the accident analyses. Laboratory testing of the carbon adsorber is performed in accordance with ASTM D3803-1989 with an acceptance criteria that is determined by applying a minimum safety factor of 2 to the charcoal filter removal efficiency credited in the design basis dose analysis as specified in Generic Letter 99-02.

The operability of the Fuel Handling Area Ventilation System during movement of irradiated fuel ensures all building exhaust flow is processed through the HEPA/charcoal filter train whenever a Fuel Handling Accident is possible. This will minimize offsite doses following the postulated Fuel Handling Accident.

**Attachment 2**

**LR-N03-0126**

**Corrected Bases Pages**

**Salem Unit 2**

**Section B 3/4.9**



### 3/4.9 REFUELING OPERATIONS BASES

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REFUELING OPERATIONS  
BASES

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