

UNITED STATES NUCLEAR REGULATORY COMMISSION

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

DOCKET NOS. 50-272 AND 50-311

NOTICE OF CONSIDERATION OF ISSUANCE OF AMENDMENT TO  
FACILITY OPERATING LICENSE, PROPOSED NO SIGNIFICANT HAZARDS  
CONSIDERATION DETERMINATION, AND OPPORTUNITY FOR A HEARING

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License Nos. DPR-70 and DPR-75 issued to the Public Service Electric and Gas Company (the licensee) for operation of the Salem Nuclear Generating Station, Units 1 and 2, located in Salem County, New Jersey.

The proposed amendment would increase the storage capacity of the spent fuel pool (SFP) from its current 1170 storage cells to 1632 storage cells. This would be accomplished by replacing 9 out of twelve of the existing high density fuel racks with 9 maximum density rack modules constructed of stainless steel and a neutron absorber material (boron carbide and aluminum-composite sandwich, product name "boral"). The proposed change would extend the date when full core discharge capacity is no longer available for Salem 1 from 1998 to 2008, and for Salem 2 from 2002 to 2012.

In addition, the proposed amendment would extend the decay time for refueling operations from 100 hours to 168 hours.

Before issuance of the proposed license amendment, the Commission will have made findings required by the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations.

The Commission has made a proposed determination that the amendment request involves no significant hazards consideration. Under the Commission's regulations in 10 CFR 50.92, this means that operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. As required by 10 CFR 50.91(a), the licensee has provided its analysis of the issue of no significant hazards consideration, which is presented below:

1. Do not involve a significant increase in the probability or consequences of an accident previously evaluated.

[Public Service Electric and Gas Company] PSE&G has evaluated the following postulated accident scenarios:

1. A spent fuel assembly drop in the SFP.
2. Loss of SFP cooling.
3. A seismic event.
4. An installation accident during reracking.

The Salem SFP has been analyzed considering fuel handling equipment, operating procedures, SFP cooling system, and seismic events. Reracking involves replacing 9 out of the 12 existing high density racks with 9 new maximum density racks. It does not require any system modifications or modifications to the cask handling crane, which by its physical location and design is prevented from moving over the SFP. Results confirm that the proposed modification does not increase the probability of the first three postulated accident scenarios.

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," sections 5.1.1, 5.1.2, and 5.1.6, provide guidance for heavy load handling operations during spent fuel storage rack replacement. Section 5.1.2 lists (4) alternatives for assuring safe heavy load handling during a fuel storage rack replacement. Alternative (1) satisfies the control of heavy loads guidelines through the implementation of defense-in-depth measures. These measures ensure that the potential for a heavy load drop is extremely small. PSE&G intends to utilize the defense-in-depth concept during reracking activities.

NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants," provides guidance for the design, fabrication, installation, and testing of highly reliable new cranes. NUREG-0612, Appendix C, "Modification of Existing Cranes," provides guidance for the implementation of NUREG-0554 at operating plants. We have evaluated anticipated fuel handling crane movements for compliance with the guidelines specified in alternative (1) of Appendix C, and determined that alternative (1) was satisfied based on the extremely small probability of a storage rack drop. The maximum weight of any storage rack and its associated handling tool is 17 tons. The fuel handling crane will be upgraded to a 20 ton lifting capacity and a design safety factor, with respect to ultimate strength, of five times the lifting capacity (i.e., 100 tons). The upgraded fuel handling crane has ample safety factor margin for storage rack movement. This applies to non-redundant load-bearing components. Special redundant lifting devices, which have a rated capacity sufficient to maintain safety factors, will be utilized for storage rack movements. Per NUREG-0612, Appendix B, the substantial safety factor margin ensures that the probability of a load drop is extremely low. Additionally, a load drop analysis was performed to ensure the integrity of the pool structure. The analysis results were acceptable.

Based on the actions discussed above, the proposed modification does not increase the probability of an installation accident.

PSE&G evaluated the consequences of a spent fuel assembly drop in the SFP and determined that the criticality acceptance criterion, Keff less than or equal to 0.95, was not exceeded. The radiological consequences of a fuel assembly drop did not change significantly from those previously analyzed. The calculated doses are well within 10CFR100 requirements. A spent fuel assembly dropped on the racks, will not cause rack distortion that would prevent the performance of their safety function. Thus, the consequences of this postulated accident are not significantly changed from those previously evaluated.

The consequences of a loss of SFP cooling were evaluated. The evaluation concluded that sufficient time is available to establish an alternate means of cooling following a complete failure of the normal SFP cooling system. Calculations show that under a normal discharge scenario, if all indirect forced cooling paths (i.e., heat removal by heat exchangers) are lost at the instant the pool water reaches its maximum value, the pool will not begin bulk boiling for at least 4.61 hours. This time interval is sufficient to allow plant personnel to establish alternate heat removal methods. A piped cross-connection exists between Unit 1 and Unit 2's SFP heat exchangers. This allows for use of the opposite Unit's heat exchanger during emergencies, or when a given Unit's Service Water header or Component Cooling System are out-of-service. Thus, the consequences of this postulated accident are not significantly changed from those previously evaluated.

The new racks are designed and fabricated to meet applicable NRC requirements and industry standards. Seismic analyses were performed on

the new racks and the existing racks using 3-D single rack (opposed phase motion) and Whole Pool Multi-Rack (WPMR) models. Kinematic and shear analyses conclude the existence of large margins of safety. The kinematic margin against rack-to-rack or rack-to-wall impact is at least 1.5 for all SFP racks. Maximum rack primary stresses, under [Safe Shutdown Earthquake] SSE conditions, are less than 50% of the allowable ASME Code value. Maximum supporting pool structure bending moments and thru-thickness shear, under factored load conditions, are less than 80% of the allowables. All racks (new and existing) are designed as free-standing racks, to ensure that rack and pool structure integrity is maintained during and after a seismic event. Thus, the consequences of a postulated seismic event are not increased from previously evaluated events.

The consequences of an installation accident were considered. All fuel in the SFP will have decayed for a minimum of (3) months prior to any heavy load movement in the SFP area. This allows sufficient time for decay of gaseous radionuclides in the fuel (gas activity). A postulated accidental gaseous release from all stored fuel assemblies would result in a potential offsite dose less than 10% of 10CFR100 limits. No equipment essential to safe reactor shutdown or employed to mitigate the consequences of an accident is located beneath, adjacent to, or within the area of influence of any load handling to support the SFP modification. Thus, the consequences of a postulated installation accident are not significantly increased from those previously evaluated.

The only postulated accident affected by decay time is a Loss of SFP cooling. The proposed increase in decay time prior to refueling operations is conservative and decreases the decay heat removal requirements. All thermal-hydraulic calculations used 168 hours as the assumed decay time and concluded that adequate heat removal capability existed. Thus, the probability and consequences of a loss of SFP cooling accident are not significantly increased from those previously evaluated.

Therefore, it may be concluded that the proposed changes do not increase the probability or consequences of an accident previously evaluated.

2. Do not create the possibility of a new or different kind of accident from any previously evaluated.

The proposed modification has been reviewed and analyzed for possible accidents. The criteria used in the analyses, design, and installation of the new spent fuel racks account for anticipated loadings and postulated conditions that may be imposed upon the structure during its lifetime, and is in conformance with established codes, standards, and specifications acceptable to the NRC.

Factors that could affect the SFP neutron multiplication factor have been addressed conservatively. PSE&G concluded that the maximum SFP

neutron multiplication, with the addition of the maximum density racks, will not exceed the subcriticality limit of  $K_{eff}$  less than or equal to 0.95.

The increase in decay time prior to refueling operations reduces the initial heat load and SFP cooling requirements. The addition of new racks and associated spent fuel will produce an incremental heat load in the SFP. However, analysis has shown that the existing SFP cooling system is sufficient to absorb this incremental heat load. The peak bulk pool temperature will be maintained below the threshold value to preclude bulk boiling. The incremental heat load does not alter SFP cooling safety considerations from those previously reviewed and found acceptable.

Rack impact analysis was performed to investigate possible impact during seismic events (i.e., rack-to-rack and rack-to-wall impacts). The analysis concluded that the proposed SFP modification does not result in rack-to-rack impact in the cellular region or rack-to-wall impact during postulated seismic events.

The basic SFP reracking technology has been reviewed and approved by the NRC in numerous applications for spent fuel capacity increases. The safety function and operation of the SFP cooling system, makeup, and structural systems are unchanged by this modification. No new failure modes are created.

Therefore, it may be concluded that the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. Do not involve a significant reduction in a margin of safety.

The safety function of the SFP and the racks is to preclude inadvertent criticality in a safe, specifically designed, underwater storage location for spent fuel assemblies that require shielding and cooling during storage and handling. The NRC Staff has established that the issue of margin of safety, when applied to reracking modifications, should address the following areas:

1. Nuclear criticality considerations.
2. Thermal-hydraulic considerations.
3. Mechanical, material, and structural considerations.

Assessment in these areas assures that the SFP and racks will withstand specified design conditions, without impairment of the structural integrity or performance of required safety functions.

The criticality analysis confirms that the new and existing rack designs meet the NRC acceptance criterion of  $K_{eff}$  less than or equal to 0.95 under all conditions. The criticality analysis methods conform to applicable industry codes, standards, specifications and NRC guidance.

Keff calculations include uncertainties at a 95%/95% probability confidence level. Thus, the proposed amendment does not involve a significant reduction in the nuclear criticality margin of safety.

Conservative methods and assumptions were used to calculate the maximum fuel temperature and the increase in SFP water temperature. The thermal-hydraulic evaluation employed methods previously used to evaluate existing spent fuel racks. The results demonstrate that the temperature margins of safety are maintained. The proposed modification, with the fuel inventory, will increase the heat load in the SFP. However, the decay time prior to refueling operations was increased from 100 to 168 hours to reduce the initial SFP cooling requirements. Evaluation results indicate that the existing SFP cooling system can maintain the bulk pool water temperature at or below 149 F under normal discharge scenarios. The maximum allowable temperature for bulk boiling is not exceeded for the calculated increase in pool heat load. Maximum local water temperatures, along the hottest fuel assembly, remain below the nucleate boiling condition. While no nucleate boiling is indicated for the standard storage condition, an assumption of 50% cell blockage results in a possible highly localized two-phase condition near the top of the fuel. Fuel clad thermal stresses remain less than 7000 psi, which is considerably lower than the endurance limit of the clad material. Thus, there is no significant reduction in the margin of safety for thermal-hydraulic or SFP cooling.

Maintaining the spent fuel assemblies in a safe configuration during normal and abnormal loadings is the primary safety function of the SFP and racks. Abnormal loading associated with an earthquake, a spent fuel assembly drop, or the drop of any other heavy object were considered. The mechanical, material, and structural design of the new spent fuel racks complies with applicable portions of the NRC OT Position Paper. Rack materials are compatible with the spent fuel pool environment and the spent fuel assemblies. The structural assessment of the new racks concluded that tilting and deflection or movement will not result in impact in the active fuel region during postulated seismic events. In addition, the spent fuel assemblies remain intact with no criticality concerns. Thus, there is no significant reduction in the margin of safety for mechanical, material and structural considerations.

Therefore, it may be concluded that the proposed changes do not involve a significant reduction in a margin of safety.

The NRC staff has reviewed the licensee's analysis and, based on this review, it appears that the three standards of 10 CFR 50.92(c) are satisfied. Therefore, the NRC staff proposes to determine that the amendment request involves no significant hazards consideration.

The Commission is seeking public comments on this proposed determination. Any comments received within 30 days after the date of publication of this notice will be considered in making any final determination.

Normally, the Commission will not issue the amendment until the expiration of the 30-day notice period. However, should circumstances change during the notice period such that failure to act in a timely way would result, for example, in derating or shutdown of the facility, the Commission may issue the license amendment before the expiration of the 30-day notice period, provided that its final determination is that the amendment involves no significant hazards consideration. The final determination will consider all public and State comments received. Should the Commission take this action, it will publish in the FEDERAL REGISTER a notice of issuance and provide for opportunity for a hearing after issuance. The Commission expects that the need to take this action will occur very infrequently.

Written comments may be submitted by mail to the Rules Review and Directives Branch, Division of Freedom of Information and Publications Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and should cite the publication date and page number of this FEDERAL REGISTER notice. Written comments may also be delivered to Room P-223, Phillips Building, 7920 Norfolk Avenue, Bethesda, Maryland, from 7:30 a.m. to 4:15 p.m. Federal workdays. Copies of written comments received may be examined at the NRC Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC 20555.

The filing of requests for hearing and petitions for leave to intervene is discussed below.

By April 4, 1994 , the licensee may file a request for a hearing with respect to issuance of the amendment to the subject facility operating license and any person whose interest may be affected by this proceeding and who wishes to participate as a party in the proceeding must file a written request for a hearing and a petition for leave to intervene. Requests for a hearing and a petition for leave to intervene shall be filed in accordance with the Commission's "Rules of Practice for Domestic Licensing Proceedings" in 10 CFR Part 2. Interested persons should consult a current copy of 10 CFR 2.714 which is available at the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC 20555 and at the local public document room located at the Salem Free Public Library, 112 West Broadway, Salem, New Jersey 08079. If a request for a hearing or petition for leave to intervene is filed by the above date, the Commission or an Atomic Safety and Licensing Board, designated by the Commission or by the Chairman of the Atomic Safety and Licensing Board Panel, will rule on the request and/or petition; and the Secretary or the designated Atomic Safety and Licensing Board will issue a notice of hearing or an appropriate order.

As required by 10 CFR 2.714, a petition for leave to intervene shall set forth with particularity the interest of the petitioner in the proceeding, and how that interest may be affected by the results of the proceeding. The petition should specifically explain the reasons why intervention should be permitted with particular reference to the following factors: (1) the nature of the petitioner's right under the Act to be made party to the proceeding; (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding; and (3) the possible effect of any order which may be entered in the proceeding on the petitioner's interest. The petition



should also identify the specific aspect(s) of the subject matter of the proceeding as to which petitioner wishes to intervene. Any person who has filed a petition for leave to intervene or who has been admitted as a party may amend the petition without requesting leave of the Board up to 15 days prior to the first prehearing conference scheduled in the proceeding, but such an amended petition must satisfy the specificity requirements described above.

Not later than 15 days prior to the first prehearing conference scheduled in the proceeding, a petitioner shall file a supplement to the petition to intervene which must include a list of the contentions which are sought to be litigated in the matter. Each contention must consist of a specific statement of the issue of law or fact to be raised or controverted. In addition, the petitioner shall provide a brief explanation of the bases of the contention and a concise statement of the alleged facts or expert opinion which support the contention and on which the petitioner intends to rely in proving the contention at the hearing. The petitioner must also provide references to those specific sources and documents of which the petitioner is aware and on which the petitioner intends to rely to establish those facts or expert opinion. Petitioner must provide sufficient information to show that a genuine dispute exists with the applicant on a material issue of law or fact. Contentions shall be limited to matters within the scope of the amendment under consideration. The contention must be one which, if proven, would entitle the petitioner to relief. A petitioner who fails to file such a supplement which satisfies these requirements with respect to at least one contention will not be permitted to participate as a party.

Those permitted to intervene become parties to the proceeding, subject to any limitations in the order granting leave to intervene, and have the

opportunity to participate fully in the conduct of the hearing, including the opportunity to present evidence and cross-examine witnesses.

If a hearing is requested, the Commission will make a final determination on the issue of no significant hazards consideration. The final determination will serve to decide when the hearing is held.

If the final determination is that the amendment request involves no significant hazards consideration, the Commission may issue the amendment and make it immediately effective, notwithstanding the request for a hearing. Any hearing held would take place after issuance of the amendment.

If the final determination is that the amendment request involves a significant hazards consideration, any hearing held would take place before the issuance of any amendment.

A request for a hearing or a petition for leave to intervene must be filed with the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Services Branch, or may be delivered to the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC 20555, by the above date. Where petitions are filed during the last 10 days of the notice period, it is requested that the petitioner promptly so inform the Commission by a toll-free telephone call to Western Union at 1-(800) 248-5100 (in Missouri 1-(800) 342-6700). The Western Union operator should be given Datagram Identification Number N1023 and the following message addressed to Charles L. Miller: petitioner's name and telephone number, date petition was mailed, plant name, and publication date and page number of this FEDERAL REGISTER notice. A copy of the petition should also be sent to the Office of the General Counsel, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to

Mark J. Wetterhahn, Esquire, Winston and Strawn, 1400 L Street, NW, Washington, D.C. 20005-3502, attorney for the licensee.

Nontimely filings of petitions for leave to intervene, amended petitions, supplemental petitions and/or requests for hearing will not be entertained absent a determination by the Commission, the presiding officer or the presiding Atomic Safety and Licensing Board that the petition and/or request should be granted based upon a balancing of the factors specified in 10 CFR 2.714(a)(1)(i)-(v) and 2.714(d).

The Commission hereby provides notice that this is a proceeding on an application for a license amendment falling within the scope of Section 134 of the Nuclear Waste Policy Act of 1982 (NWPA), 42 U.S.C. 10154. Under Section 134 of the NWPA, the Commission, at the request of any party to the proceeding, must use hybrid hearing procedures with respect to "any matter which the Commission determines to be in controversy among the parties." The hybrid procedures in Section 134 provide for oral argument on matters in controversy, preceded by discovery under the Commission's rules, and the designation, following argument, of only those factual issues that involve a genuine and substantial dispute, together with any remaining questions of law, to be resolved in an adjudicatory hearing. Actual adjudicatory hearings are to be held on only those issues found to meet the criteria of Section 134 and set for hearing after oral argument.

The Commission's rules implementing section 134 of the NWPA are found in 10 CFR Part 2, Subpart K, "Hybrid Hearing Procedures for Expansion of Spent Nuclear Fuel Storage Capacity at Civilian Nuclear Power Reactors" (published at 50 FR 41662, October 15, 1985) to 10 CFR 2.1101 et seq. Under those rules, any party to the proceeding may invoke the hybrid hearing procedures by filing

with the presiding officer a written request for oral argument under 10 CFR 2.1109. To be timely, the request must be filed within 10 days of an order granting a request for hearing or petition to intervene. (As outlined above, the Commission's rules in 10 CFR Part 2, Subpart G, and 2.714 in particular, continue to govern the filing of requests for a hearing or petitions to intervene, as well as the admission of contentions.) The presiding officer shall grant a timely request for oral argument. The presiding officer shall grant an untimely request for oral argument only upon showing of good cause by the requesting party for the failure to file on time and after providing the other parties an opportunity to respond to the untimely request. If the presiding officer grants a request for oral argument, any hearing held on the application shall be conducted in accordance with hybrid hearing procedures. In essence, those procedures limit the time available for discovery and require that an oral argument be held to determine whether any contentions must be resolved in adjudicatory hearing. If no party to the proceedings requests oral argument, or if all untimely requests for oral argument are denied, then the usual procedures in 10 CFR Part 2, Subpart G, apply.

For further details with respect to this action, see the application for amendment dated April 28, 1993, and revisions to this submittal dated August 12, 1993, November 17, 1993 and February 2, 1994, which are available for public inspection at the Commission's Public Document Room, the Gelman

Building, 2120 L Street, NW., Washington, DC 20555 and at the local public document room located at the Salem Free Public Library, 112 West Broadway, Salem, New Jersey 08079.

Dated at Rockville, Maryland, this 25th day of February 1994.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script that reads "James C. Stone".

James C. Stone, Project Manager  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation