

May 9, 2008

Mr. Randall K. Edington  
Executive Vice President Nuclear/  
Chief Nuclear Officer  
Mail Station 7602  
Arizona Public Service Company  
P. O. Box 52034  
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNIT 2 - ISSUANCE OF  
EXIGENT AMENDMENT RE: REVISED MINIMUM WATER LEVEL FOR  
TECHNICAL SPECIFICATION 3.5.5, REFUELING WATER TANK (TAC  
NO. MD8496)

Dear Mr. Edington:

The Commission has issued the enclosed Amendment No. 169 to Facility Operating License No. NPF-51, for the Palo Verde Nuclear Generating Station, Unit 2. The amendment consists of changes to Technical Specification (TS) 3.5.5, "Refueling Water Tank (RWT)," in response to your application dated April 10, 2008, as supplemented by letter dated April 30, 2008.

The amendment revises TS Figure 3.5.5-1, "Minimum Required RWT Volume," by approximately 3 percent. This change will ensure that there is adequate water volume available in the RWT to ensure that the engineered safety feature pumps and the new containment recirculation sump strainers will meet their design functions during loss-of-coolant accidents.

This amendment is being issued under exigent circumstances in accordance with Section 50.91(a)(6) of Title 10 of the *Code of Federal Regulations*. The exigent circumstances and final no significant hazards considerations are addressed in Sections 4.0 and 5.0 of the enclosed Safety Evaluation.

The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Michael T. Markley, Senior Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. STN 50-529

Enclosures: 1. Amendment No. 169 to NPF-51  
2. Safety Evaluation

cc w/encls: See next page

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Docket No. STN 50-529

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2. Safety Evaluation

cc w/encls: See next page

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(\* Concurrency via SE (\*\* See previous concurrence

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DATE	5/7/08	5/7/08	5/7/08	5/2/08
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OFFICIAL RECORD COPY

Palo Verde Nuclear Generating Station

04/14/2008

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ARIZONA PUBLIC SERVICE COMPANY, ET AL.  
DOCKET NO. STN 50-529  
PALO VERDE NUCLEAR GENERATING STATION, UNIT 2  
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 169  
License No. NPF-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated April 10, 2008, as supplemented by letter dated April 30, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C(2) of Facility Operating License No. NPF-51 is hereby amended to read as follows:

- (2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 169, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of the date of issuance and shall be implemented prior to startup from the 2008 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Thomas G. Hiltz, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility  
Operating License No. NPF-51  
and Technical Specifications

Date of Issuance: May 9, 2008

ATTACHMENT TO LICENSE AMENDMENT NO. 169

FACILITY OPERATING LICENSE NO. NPF-51

DOCKET NO. STN 50-529

Replace the following pages of the Facility Operating License No. NPF-51 and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Operating License

Replace Page 6 of Facility Operating License No. NPF-51 with the attached Page 6.

Technical Specifications

REMOVE

3.5.5-3

INSERT

3.5.5-3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 169 TO FACILITY OPERATING LICENSE NO. NPF-51  
ARIZONA PUBLIC SERVICE COMPANY, ET AL.  
PALO VERDE NUCLEAR GENERATING STATION, UNIT 2  
DOCKET NO. STN 50-529

1.0 INTRODUCTION

By application dated April 10, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML081080116), as supplemented by letter dated April 30, 2008 (ADAMS Accession No. ML081280495), Arizona Public Service Company (APS, the licensee) requested changes to the Technical Specifications (TSs) for Palo Verde Nuclear Generating Station (Palo Verde), Unit 2. The supplemental letter dated April 30, 2008, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on April 17, 2008 (73 FR 20961).

The proposed changes would revise TS Figure 3.5.5-1, "Minimum Required RWT [Refueling Water Tank] Volume," to increase the minimum required RWT volume for Unit 2 by approximately 3 percent. This change will ensure that there is adequate water volume available in the RWT to ensure that the engineered safety feature (ESF) pumps and the new containment recirculation sump strainers will meet their design functions during loss-of-coolant accidents (LOCAs).

On May 5, 2008, the licensee informed the NRC staff of new information from its design-basis reviews concerning the analysis of instrument uncertainty that could affect the minimum required RWT volume. During a subsequent telephone call on May 6, 2008, APS representatives confirmed to the NRC that the small-break LOCA analysis is bounding for Palo Verde, Unit 2, and the instrument uncertainty is within the current licensing and design basis provided in this amendment. The licensee stated that new information does not affect this amendment and is being addressed through the Palo Verde corrective action program.

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.91(a)(6), the licensee requested that the proposed amendment be issued under exigent circumstances in order to support completion of outage-related modifications for the new containment sump strainers. Without approval of this amendment, Unit 2 would not be able to enter Mode 4 following the spring 2008 refueling outage.

## 2.0 REGULATORY EVALUATION

In 10 CFR 50.36, "Technical Specifications," the NRC established its regulatory requirements related to the content of TS. Pursuant to 10 CFR 50.36, TSs are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings, (2) limiting conditions for operation, (3) surveillance requirements, (4) design features, and (5) administrative controls. The rule does not specify the particular requirements to be included in a plant's TS. As stated in 10 CFR 50.36(d)(2)(i), the "[l]imiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility." The regulations in 10 CFR 50.36(d)(3) state that "[s]urveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components will be maintained within safety limits, and that the limiting conditions for operation will be met."

In Section 4.1 of its license amendment request (LAR) dated April 10, 2008, the licensee identified the applicable regulations in 10 CFR 50, Appendix A, "General Design Criteria [GDC] for Nuclear Power Plants," including:

- GDC 13, "Instrumentation and control."
- GDC 16, "Containment design."
- GDC 35, "Emergency core cooling."
- GDC 38, "Containment heat removal."

The licensee identified the following NRC guidance and generic communications related to ensuring water sources are available for long-term cooling, minimum water volume for emergency core cooling and containment spray systems to operate in all design-basis accidents (DBAs), and ensuring that adequate water level is available for the containment sump strainers to function during recirculation:

- NRC Regulatory Guide (RG) 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," June 1974.
- NUREG/CR-6874, "GSI [Generic Safety Issue]-191: Experimental Studies of Loss-of-Coolant-Accident-Generated Debris Accumulation and Head Loss with Emphasis on the Effects of Calcium Silicate Insulation," April 2004 (ADAMS Accession No. ML051540121).
- NRC Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors," dated September 13, 2004 (ADAMS Accession No. ML042360586).

In Section 4.2 of its LAR dated April 10, 2008, the licensee also identified regulatory precedents at Comanche Peak Steam Electric Station (Reference 6), Diablo Canyon Power Plant (Reference 7), and Vogtle Electric Generating Plant (Reference 8). The NRC approved the Diablo Canyon submittal in a letter dated March 26, 2008 (ADAMS Accession No. ML080810013) (Reference 9).

In addition to the above, the NRC staff also reviewed the licensee's request relative to current methods described in RG 1.82, Revision 3, "Water Sources for Long-Term Recirculation Following a Loss-of-Coolant Accident," and RG 1.105, Revision 1, "Instrument Setpoints," and Revision 3, "Setpoints for Safety-Related Instrumentation" (References 10 and 11, respectively). In the APS letter dated April 30, 2008, the licensee responded to the NRC staff request for additional information concerning the instrumentation calculation methodology and measures to ensure operability.

### 3.0 TECHNICAL EVALUATION

The staff has reviewed the licensee's regulatory and technical analyses in support of its proposed license amendment which are described in Section 3 of the licensee's LAR dated April 10, 2008 (Reference 1), and response to the request for additional information dated April 30, 2008 (Reference 2). Based on the detailed evaluation below, the NRC staff concludes that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

The containment recirculation sump provides for the collection of reactor coolant and chemically reactive spray solutions following a LOCA. The containment recirculation sump serves as the water source to effect long-term recirculation functions of emergency core cooling and containment atmosphere cleanup. Following a LOCA, the suction supply for the emergency core cooling system and containment spray system pumps during recirculation is provided by the containment recirculation sump. Both the high-pressure safety injection and the containment spray system pump suctions are automatically switched from the RWT to the containment recirculation sump by a recirculation actuation signal from the engineered safety actuation system at a specified RWT level, otherwise known as the recirculation action setpoint (RAS).

In response to Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," dated September 13, 2004, the licensee is installing new containment recirculation sump strainers. To ensure that there would be adequate water volume in the containment to meet the functional requirements of the ESF pumps and the new containment recirculation sump strainers during DBAs and break scenarios, the containment recirculation sump strainers would need to be submerged. Based on its recent GL 2004-02 analysis (ADAMS Accession No. ML080710546) (Reference 12), a higher minimum RWT volume and level is needed to ensure that the containment recirculation sump strainers would be submerged. The licensee identified the scenario of concern as being a small-break LOCA involving a break at the top of the pressurizer. The break size and location would result in less spillage of reactor coolant to the containment floor and system pressure would not allow the water from the safety-injection tanks (SITs) to inject. Based on the Palo Verde Updated Final Safety Analysis Report (UFSAR) (Reference 13), about 7,656 cubic feet (or 57,300 gallons) of water would remain in the SITs.

The proposed LAR would revise TS Figure 3.5.5-1 to raise the required RWT minimum level and corresponding volume values shown by approximately 3 percent. This change would revise the minimum level and corresponding volumes used to determine operability of the RWT from 210 degrees Fahrenheit (°F) through 600 °F, to ensure that there would be adequate volume available for the design functions of the RWT. This change is intended to ensure that there is

adequate water volume available in the containment to meet functional requirements of the ESF pumps and the containment sump strainers for applicable DBAs and break scenarios.

The licensee has determined that the minimum flood level requires the transfer of at least 543,200 gallons at 600 °F of water from the RWT to the reactor coolant system (RCS) (and eventually to the containment sump) prior to receipt of the RAS. The licensee has also determined that, in order to make this amount of water available, the RWT level would have to indicate 83 percent of scale, an increase of approximately 3 percent over the current value. The proposed approximately 3 percent increase amounts to about 24,000 gallons of water.

The licensee calculated the RWT minimum level and corresponding volume using a calculation methodology that is consistent with RG 1.105. The calculation uses the square-root-sum-of-the-squares method and includes bias uncertainties, bistable uncertainties, indicator uncertainties, temperature variations, and drift.

The licensee also provided information concerning the surveillance procedures for RWT level and volume. The licensee performs periodic surveillances to verify that specific settings are within an acceptable range. The As-Left tolerance band is the acceptance criteria for the As-Left value. If the As-Found value is within the As-Left tolerance band, the calibration would be considered acceptable. Any values found to be outside the As-Left tolerance band must be reset to a value within the As-Left tolerance band for the surveillance to be completed satisfactorily. If the As-Found value associated with a setpoint with an Allowable Value (AV) in the TSs exceeds the AV, then the channel would be declared inoperable and the associated TS action requirements followed. If the As-Found value is outside the predefined As-Found tolerance band, but the instrument channel is functioning as expected and can be reset to within the As-Left tolerance band, then the channel would be returned to service and the event entered into the licensee's Corrective Action Program for further evaluation and trending. If at anytime it cannot be determined that an instrument is functioning as required, the instrument would be declared inoperable and the associated TS action requirements followed.

Based on this information, the licensee's calculation used the square-root-of-the-sum-of-the-squares method and meets the guidance of RG 1.105. The licensee's procedures would maintain the RWT minimum level and corresponding volume within the established tolerances to ensure that the systems will be capable of performing their specified function. Based on its review of the licensee's submittals, the staff finds the proposed TS changes acceptable.

TS Figure 3.5.5-1 currently requires RWT of 576,616 gallons of borated water at 210 °F to 600,000 gallons of borated water at 565 °F. This would remain the TS requirements in revised Figure 3.5.5-1 for Palo Verde Units 1 and 3.

For Unit 2, the revised TS Figure 3.5.5-1 would require 601,000 gallons of borated water at 210 °F to 624,000 gallons of borated water at 565 °F.

The NRC staff concludes that the licensee has demonstrated that their proposal to increase the minimum required RWT water volumes, in TS Figure 3.5.5-1, by approximately 3 percent, would continue to satisfy the analysis acceptance criteria for the affected licensing basis events (e.g., the LOCA events). Therefore, the licensee's proposal is consistent with its no significant hazards consideration, and in accordance with the terms of 10 CFR 50.92(c).

#### 4.0 EXIGENT CIRCUMSTANCES

In accordance with 10 CFR 50.91(a)(6)(vi), the licensee provided the following explanation regarding the exigency and why it could not be avoided, and why APS has used its best efforts to make a timely application for the amendment.

In response to questions raised in 2007 concerning the conservatism in some flood water volume assumptions for some pipe breaks used in the containment flooding calculations, APS performed an evaluation of the containment flooding analysis. APS has been working to address these questions along with completing the testing and validation of the new strainer design provided in response to GL 2004-02. The potential RWT level issue was identified in APS letter No. 102-05819 to NRC, "Response to NRC Request for Additional Information Related to Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," dated February 29, 2008 (ADAMS Accession No. ML080710546).

APS applied appropriate rigor in re-evaluating the minimum flood level available for a small break LOCA on the top of the pressurizer to ensure that the scenario was properly defined and that the assumptions were accurate and reasonable. A revision of the containment flooding calculation was performed including independent and third party verification. The NSSS vendor also analyzed the credibility of the scenario to ensure it warranted being added to the design basis. The results of that effort indicate that the TS minimum RWT levels and associated volumes shown in TS Figure 3.5.5-1 will not result in sufficient flood level to assure submergence of the new containment recirculation sump strainers as designed. Therefore, the minimum TS RWT levels are non-conservative. Once that determination was made, APS identified that a TS change was required per 10 CFR 50.59 for Unit 2 to implement the new strainer modification and this amendment request was initiated.

There is no operability concern for any of the PVNGS Units because the RWT level in the three PVNGS Units is being administratively maintained at 3% above the current TS Figure 3.5.5-1 levels.

This condition is exigent for Unit 2, as it entered into a refueling outage on March 29, 2008, and during this outage the new containment sump strainers will be installed as part of APS's commitments related to GL 2004-02. Without this amendment ... the Unit 2 strainers modification can not be completed and Unit 2 would not be able to enter Mode 4 scheduled for May 11, 2008. As a result, this amendment request meets 10 CFR 50.91 guidance in that a failure to act in a timely way would result in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level.

The staff concluded that this justification is acceptable and meets the intent of 10 CFR 50.91(a)(6)(vi) for processing an exigent license amendment.

#### 5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION (NSHCD)

The Commission may issue the license amendment before the expiration of the 60-day period provided that its final determination is that the amendment involves no significant hazards

consideration. This amendment is being issued prior to the expiration of the 60-day period. Therefore, a final finding of no significant hazards consideration follows.

The Commission has made a final 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 does 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. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change would raise the RWT minimum level by 3% to ensure that there is adequate water volume available at the containment recirculation sumps for the limiting small break LOCA scenario for submergence of the new strainer designs that are being installed in Unit 2 in the spring 2008 outage. The new strainers are designed and tested to operate submerged at the start of recirculation actuation post-LOCA. This change ensures that the level of water at the strainers supports this assumption of the design.

The RWT water volume is not an initiator of any accident previously evaluated. As a result, the probability of an accident previously evaluated is not affected. The proposed change does not alter or prevent the ability of structures, systems, and components from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits.

The effect on containment flood level, equipment qualification, and containment sump pH [potential of hydrogen] remain within the limits assumed in the design and accident analyses. The calculated maximum containment flood level is based on the RWT water level associated with the bottom of the RWT overflow nozzle. This change does not revise the location of the RWT overflow nozzle and there is no change in the calculated maximum flood level. As a result, the proposed change has no impact on the qualification of equipment above the maximum containment flood level. For the same reason the impact of the proposed change on post-LOCA sump pH is bounded by the current analysis for post-LOCA sump pH. In that analysis, the calculated minimum post-LOCA sump pH is based on the maximum RWT water level associated with the bottom of the RWT overflow nozzle. The maximum flood level is not affected by this change. In addition, the change is conservative with respect to the calculated maximum post-LOCA sump pH since it is increasing the minimum required RWT volume.

The proposed change does not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. Further, the proposed change does not increase the types or amounts of radioactive effluent that may

be released offsite, nor significantly increase individual or cumulative occupational/public radiation exposures. The proposed change is consistent with the safety analysis assumptions and resultant consequences.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The change does not involve a physical alteration of the plant (i.e., no new or different components or physical changes are involved with this change) or a change in the methods governing normal plant operation. The change does not alter any assumptions made in the safety analysis.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The proposed change to raise the required RWT minimum water volume does not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by this change. The proposed change will not result in plant operation in a configuration outside of the design basis.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

The NRC staff has reviewed the licensee's analysis and, based on this review, determined that the three standards of 10 CFR 50.92 are satisfied. Therefore, the NRC staff has determined that the amendment involves no significant hazards consideration.

## 6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arizona State official was notified of the proposed issuance of the amendment. The State official had no comments.

## 7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The

Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding published in the *Federal Register* on April 17, 2008 (73 FR 20961). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) the amendment does not (a) involve a significant increase in the probability or consequences of an accident previously evaluated, (b) create the possibility of a new or different kind of accident from any accident previously evaluated, or (c) involve a significant reduction in a margin of safety and, therefore, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; (3) such activities will be conducted in compliance with the Commission's regulations; and (4) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## 9.0 REFERENCES

1. Letter dated April 10, 2008, from D.C. Mims, APS, to NRC, Subject: Request for Amendment to Technical Specification 3.5.5, Refueling Water Tank (RWT), to Increase the RWT Minimum Water Level for Unit 2 Under Exigent Circumstances (ADAMS Accession No. ML081080116).
2. Letter dated April 30, 2008, from D.C. Mims, to NRC, Subject: Response to Request for Information Regarding Request for Amendment to Technical Specification 3.5.5, Refueling Water Tank (RWT), to Increase the RWT Minimum Water Level for Unit 2 Under Exigent Circumstances (ADAMS Accession No. ML081280495).
3. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," June 1974.
4. U.S. Nuclear Regulatory Commission, NUREG/CR-6874, "GSI-191: Experimental Studies of Loss-of-Coolant-Accident-Generated Debris Accumulation and Head Loss with Emphasis on the Effects of Calcium Silicate Insulation," April 2004 (ADAMS Accession No. ML051540121).
5. U.S. Nuclear Regulatory Commission, Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors," dated September 13, 2004 (ADAMS Accession No. ML042360586).
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