October 1, 2001

Mr. Gregg R. Overbeck
Senior Vice President, Nuclear
Arizona Public Service Company
P. O. Box 52034
Phoenix, AZ 85072-0234

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION UNITS 1, 2 AND 3 - REQUEST FOR CODE ALTERNATIVE FOR THE USE OF MECHANICAL NOZZLE SEAL ASSEMBLIES - RELIEF REQUEST NO. 17 (TAC NOS. MB1618, MB1619, AND MB1620)

Dear Mr. Overbeck:

By letter dated April 1, 2001, Arizona Public Service Company (APS) submitted a relief request, No. 17, to use an alternative repair method for Reactor Coolant System pressurizer heater sleeves. The request proposes an alternative to repair requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI that would authorize the use of Mechanical Nozzle Seal Assemblies for a period not to exceed two operating cycles. APS cited 10 CFR 50.55a(a)(3)(i) as their basis for requesting the relief.

The NRC staff's evaluation and conclusions are contained in the enclosed safety evaluation. The NRC staff finds that the proposed alternative provides an acceptable level of quality and safety and, therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for a duration not to exceed two operating cycles.

Sincerely,

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,
and STN 50-530

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE MECHANICAL NOZZLE SEAL ASSEMBLY

INSTALLATION ON PRESSURIZER HEATER SLEEVES

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

DOCKET NO. STN 50-528, STN 50-529 AND STN 50-530

1.0 INTRODUCTION

By letter dated April 1, 2001, Arizona Public Service Company (APS) requested relief from the 10 CFR 50.55a repair requirements as implemented through the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. APS has requested authorization for alternative use of Combustion Engineering designed mechanical nozzle seal assemblies (MNSAs) for reactor coolant system (RCS) pressurizer heater sleeves at the Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3. The use of the MNSAs would be for a duration not to exceed two operating cycles.

2.0 BACKGROUND

MNSAs are mechanical devices that are designed to fit around ASME Code Class 1 Alloy 600 nozzles as a means of preventing leakage past the nozzles. The MNSA design consists of two split gasket/flange assemblies. A gasket made from Grafoil packing, a graphite compound, is compressed within the gasket assembly to prevent reactor coolant pressure boundary (RCPB) leakage past the nozzle. The gasket assembly is bolted in place into holes that are drilled and threaded on the outer surface of the RCPB wall. A second assembly is bolted to the flanges which serves as the structural attachment of the nozzle to the wall. The flange assembly serves to carry the loads in lieu of the partial penetration J-groove welds used to adjoin the nozzles to the particular RCPB vessel or piping component of interest.

The potential exists for leaks to occur in pressurizer Alloy 600 heater sleeves due to primary water stress corrosion cracking (PWSCC). The typical repair of these heater sleeves utilizes either an internal or external weld repair. As an alternative under the provisions of 10 CFR 50.55a(a)(3)(i), the use of a MNSA is proposed as a temporary repair method to restore the integrity and prevent leakage of cracked heater sleeves for up to two cycles of operation.

PVNGS performs dedicated walk-downs of the RCS Alloy 600 nozzles and heater sleeves at the start of each outage. There are no currently identified nozzle or pressurizer heater sleeve leaks at PVNGS. However, during the recently completed ninth refueling outage at PVNGS Unit 2, evidence of pressurizer heater sleeve pressure boundary leakage was detected. The cause of the failed heater sleeve appears to have been PWSCC. This heater sleeve was repaired on an emergency basis, causing significantly increased personnel doses and requiring extended drained-down or de-fueled conditions.

Based on experience with Alloy 600 at PVNGS and the industry, APS believes that a reasonable potential exists for future pressurizer heater sleeve leakage to occur, and is currently evaluating a long-term strategy to repair or replace the existing pressurizer heater sleeves.

The heater sleeves are welded to the pressurizer bottom head with internal “J”-groove welds. These welds have been found to be susceptible to PWSCC. The typical permanent repair of these sleeves consists of either installing a heater sleeve plug welded to a temper-bead pad, or a half sleeve replacement. APS has stated that these repair methods are extremely difficult to implement on an emergency basis since they require the un-planned extension of drained-down or de-fueled conditions and cause a significant increase in worker radiation exposure while the work is being performed. The temporary use of MNSAs will provide APS with a contingency to address emergency repairs of cracked heater sleeves until permanent repair/replacements are implemented. MNSAs can be effectively installed under various plant conditions and thus will provide outage schedule flexibility. MNSAs would be used if heater sleeve leaks are identified that would require full-core offload and drain down to facilitate weld repair/replacement. Unplanned repair/replacement of these heater sleeves could significantly increase plant outage duration for no significant safety benefit in comparison to the temporary use of MNSAs combined with a well-planned heater sleeve repair/replacement effort.

The NRC has previously approved the use of MNSAs on the PVNGS hot leg instrumentation nozzles, and at other plants (e. g., San Onofre Nuclear Generating Station, Units 2 and 3, Waterford Generating Station, Unit 3, and Fort Calhoun, Unit 1). Approval of the APS request would be the first application of MNSAs for pressurizer heater sleeves.

APS’s request is being submitted under the provision of 10 CFR 50.55a(a)(3)(i), which allows licensees to propose alternatives to the requirements of Section XI of the ASME Boiler and Pressure Vessel Code, if the alternatives are demonstrated to provide an acceptable level of quality and safety in lieu of complying with actual conditions of the Section XI requirements.

2.1 Applicable ASME Codes

In accordance with APS Project Specification No. 14273-PE-130, the following ASME Codes are applicable to the APS pressurizers and MNSAs:

- Construction Code for the pressurizer assemblies at PVNGS Units 1, 2, and 3 is the 1971 Edition of ASME Section III, inclusive of the Winter 1993 Addenda

- Construction Code associated with installation is the 1974 Edition of ASME Section III, inclusive of the Winter 1975 Addenda

- Construction Code for the MNSA project is the 1989 Edition of ASME Section III, no addenda

- Inservice Inspection Code for PVNGS Units 1, 2, and 3 is the 1992 Edition of ASME Section XI, inclusive of the 1992 Addenda

Section 10 CFR 50.55a currently endorses editions of Section III and Section XI to the ASME Code through the 1995 Editions of the Sections, inclusive of the 1996 Addenda.

2.2 Applicable Regulations

Paragraph NB-3337.1, to the 1971 Edition of the ASME Code, Section III, requires that ASME Code Class 1 nozzles be attached using permissible welded joint configurations identified in Paragraph NB-3352.

Section 50.55a(g)(4) to Part 50 of Title 10, *Code of Federal Regulations* [10 CFR 50.55a(g)(4)] requires that, throughout the service life of a boiling or pressurized water-cooled nuclear power generation facility, components (including supports) which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI .

Table IWB-2500-1 to Section XI Article IWB-2500 requires that partial penetration welded nozzles to ASME Code Class 1 components be inspected according to the appropriate inspection items in Examination Category B-P, "All Pressure Retaining Components." Table IWB-2500-1 to Section XI Article IWB-2500 (1989 Edition) also requires that heater penetration welds to ASME Code Class 1 pressurizer vessels be inspected according to Item B4.20 of Examination Category B-E, "Pressure Retaining Partial Penetration Welds in Vessels." These inspection categories require VT-2 type examinations of the pressurizer heater sleeves.

Section XI Paragraph IWB-3142 of the 1992 Edition, requires that flaws in ASME Class 1 components that are detected by visual examination and determined to be unacceptable for further service under the applicable flaw size acceptance standards identified in Table IWB-3410-1 or acceptable analytical evaluations be either repaired or replaced.

Section XI Paragraph IWA-4170 of the 1992 Edition, requires that repairs and installation of replacement items be performed in accordance with the owner's design specification and original construction code.

Section XI Paragraph IWA-4310 of the 1992 Edition, requires that defects be removed in entirety or partially to a size found allowable by Article IWA-3000 prior to implementation of any repair or replacement process.

2.3 Licensing Basis

Section 50.55a to Title 10 of the *Code of Federal Regulations* (10 CFR 50.55a), requires in paragraph (g), in part, that all inservice examinations and system pressure tests conducted during the first 10-year interval and subsequent intervals on American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 components comply with the requirements in the latest edition and addenda of Section XI incorporated by reference in 10 CFR 50.55a(b), on the date 12 months prior to the start of the 10-year interval. By reference to, and implementation of, ASME Code Section XI, paragraphs IWB-3132 or IWB-3142,10 CFR 50.55a also requires that existing flaws in ASME Code Class components be removed by mechanical means, or else that the components be repaired or replaced to the extent necessary to meet the acceptance standards in ASME Code Section XI, Article

IWB-3000. Detection of leaks in the structural portion of an ASME Code Class 1, 2, or 3 component is direct evidence of a flaw in the component.

Paragraph IWA-4170 of Section XI of the ASME Code requires that repairs and the installation of replacements to the reactor coolant pressure boundary be performed and reconciled in accordance with the Owner's Design Specifications and Original Code of Construction for the component or system. The RCS pressurizers of the PVNGS units were designed and constructed to the rules of ASME Section III, 1971 Edition through and including the Winter 1973 Addenda.

Paragraph NB-3671.7 to Section III of the ASME Code, "Sleeve Coupled and Other Patented Joints," requires that ASME Code Class 1 joints be designed to meet the following criteria:

(1) Provisions must be made to prevent separation of the joint under all service loading conditions,

(2) The joint must be designed to be accessible for maintenance, removal, and replacement activities, and

(3) The joint must either be designed in accordance with the rules of ASME Code, Section III, Subarticle NB-3200, or else be evaluated using a prototype of the joint that will be subjected to additional performance tests in order to determine the safety of the joint under simulated service conditions.

2.4 Requested Relief

APS has requested relief from the requirements of 10 CFR 50.55a(g)(4), and hence from the defect removal and repair requirements of Section XI Article IWA-4000 (i.e., Paragraphs IWA-4170 and IWA-4310), and hence by reference to design rules of the Construction Code of record for the component from design requirements of NB-3337.1 of Section III to the ASME Code for welded attachments to ASME Code Class 1 piping or vessels.

2.5 Proposed Alternative Program

Pursuant to 10 CFR 50.55a(a)(3)(i), APS seeks relief to leave any reported leaks in PVNGS pressurizer heater sleeves inservice and, as an alternative, to temporarily use MNSAs as a temporary alternative means of repairing and restoring the pressure boundary function of any PVNGS pressurizer heater sleeves that are determined to be leaking as a result of the licensee's implementation of applicable inservice inspection examinations.

3.0 <u>EVALUATION</u>

3.1 Materials

Leaks can potentially occur in ASME Code Class 1 Alloy 600 instrumentation and sampling nozzles as a result of PWSCC. The repair/replacement activity and re-examination criteria of Article IWB-3000 require, in part, that repair/replacement activities and re-examination activities be in compliance with the general requirements of Article IWA-4000, including Paragraph IWA-4170. The defect removal provisions of Section XI Paragraph 4130 require that defects be removed by a metal removal process to an acceptable flaw size prior to implementation of any repair or replacement process.

APS is proposing to install and use MNSAs as an alternative for repairing and restoring the pressure boundary function of an ASME Code Class 1 pressurizer heater sleeve if leakage is detected from the component.

The materials of fabrication for MNSA subcomponents conform to the following ASME materials specifications:

- MNSA metallic assembly components are fabricated from ASME SA479, Type 304 stainless steels.

- MNSA bolting materials are fabricated from SA-453, Grade 660 high temperature alloy.

The MNSAs are designed to meet the following fabrication and installation criteria:

- Use approved materials in accordance with the rules of ASME Boiler and Pressure Vessel Code, Section III,

- To prevent separation of the joint, and remain leak-tight under all service loadings for temporary applications, and

- To be accessible for maintenance, removal, and replacement following installation.

PVNGS Improved Technical Specification (ITS) 3.4.14 for the RCS does not allow for any leakage past the RCPB. The MNSAs will temporarily serve as the pressure boundary component for leaking Alloy 600 pressurizer heater sleeves. Should APS determine that there is leakage past a MNSA during operation at modes 1, 2, or 3, the ITS would require APS to stop the leakage within 4 hours of detection, or else place the affected PVNGS unit in the hot standby operating mode within the following 6 hours, and in the cold shutdown operating mode within the following 36 hours. APS would also be required to report the event pursuant to the licensee event report requirements of 10 CFR 50.73(a)(2)(i). Furthermore, ASME Section XI Table IWB-2500-1, Inspection Category B-P, requires U.S. nuclear licensees to perform system leakage tests and VT-2 type examinations of all pressure retaining components in their RCPBs once every refueling outage. APS will, therefore, be required to perform these tests and examinations on any MNSA that is temporarily installed over a leaking pressurizer heater sleeve in the PVNGS RCPBs. Leakage of borated reactor coolant past a MNSA design would be an indication for APS to dismantle and examine the MNSA subcomponents for corrosion and material degradation.

The NRC staff has previously approved MNSA designs as acceptable temporary alternative pressure boundary repairs for leaking ASME Code Class 1, Alloy 600 nozzles at other nuclear facilities (Ref. 2-6). It should be noted that the NRC staff is currently discussing the acceptability of using MNSAs for long-term applications with the ASME Main Committee and with the Combustion Engineering Owners Group. However, MNSAs have not been used for a sufficient period of time to support the conclusion that the MNSAs will have long-term corrosion resistance in ASME Code Class 1 applications. Furthermore, one licensee has recently reported the occurrence of leakage past two of the three MNSAs that were installed on the

RCPB hot leg of their facility (Ref. 7). The staff concludes, therefore, that, while the MNSA design is acceptable for temporary installation on ASME Code Class 1, Alloy 600 nozzles, there is not enough technical evidence to support the use of MNSAs for long term applications.

3.2 Structural

APS requests the use of MNSAs pursuant to 10 CFR 50.55a(a)(3)(i), stating that this alternative provides an acceptable level of quality and safety. In order to determine if the MNSAs provided an acceptable level of quality and safety, the NRC staff compared the MNSA design and operational characteristics to the applicable ASME requirements, reviewed the MNSAs' resistance to corrosion for the intended service period, and evaluated the licensee's commitments associated with the use of the MNSAs.

The MNSAs are designed, fabricated, and constructed using approved ASME Code materials (except for the Grafoil gasket, which is a non-Code material), in accordance with the applicable rules of ASME Section III. The MNSAs are designed to prevent separation of the joint under all service loadings. This design is supported by technical analysis and tests that meet the design criteria specified in ASME Section III, Subsection NB, 1989 Edition, no Addenda. Appendix B to the licensee's letter of April 1, 2001, "ASME Construction Code Reconciliation Report" documents the required ASME Section XI, IWA-4170(b), reconciliation of the construction codes for the use of a component built to a later edition of the Code, which the NRC staff finds acceptable. Additionally, MNSA installations are accessible for maintenance, removal, and replacement. The provisions of NB-3671.7 are therefore nominally satisfied.

The Westinghouse Electric Company Design Report No. PV-PS-DR-0006, Rev. 01, "Addendum to CENC-1336, CENC-1395 and CENC-1490, Analytical Reports for Arizona Units 1, 2, and 3 Pressurizers", was provided as Appendix A to the licensee's letter of April 1, 2001. The analysis contained in this appendix included the following items:

- Stress analysis to demonstrate that stresses do not exceed the corresponding allowable values as stated in the ASME Code (NB-3200),
- Fatigue analysis to demonstrate that the code-prescribed cumulative usage factor of 1.0 is not exceeded (NB-3222.4), and
- Analysis to demonstrate that there is adequate reinforcement in the wall of the pressurizer bottom head for the bolt holes (NB-3332).

The appendix consists of the following two attachments:

Attachment A, "Analysis of Palo Verde Units 1, 2 and 3 Pressurizer Heater Sleeve MNSA," describes the analysis of the heater sleeve MNSA components under various ASME Section III service load conditions. The internal loads on these components and the stresses are determined from basic strength-of-materials principles and acceptable engineering approximations.

Attachment B, "Calculation No. A-PVNGS-9449-1259, Rev. 01, Evaluation of Attachment Locations for Mechanical Nozzle Seal Assemblies on Arizona Public Service Palo Verde Units 1, 2 and 3 Pressurizer Heater Sleeves," describes the wall reinforcement analysis, per

NB-3330, and the fatigue analysis of the modified pressurizer bottom head wall with blind bolt holes drilled and tapped on the outside wall surface, in accordance with the rules in NB-3222.4. The fatigue analysis was performed in accordance with the original construction code for the PVNGS pressurizers (ASME Section III, 1971 Edition, through Winter 1973 Addenda), subject to transient conditions specified in PVNGS Design Specification 00000-PE-130, Revision 06, General Specification for a Pressurizer Assembly, May 1978. The stresses and stress ranges in the pressurizer bottom head were calculated from standard analytical expressions for the stresses at the outer surface of a spherical shell solid wall, subjected to internal pressure and a through-wall temperature gradient arising from the highest internal temperature of the pressurizer. The maximum stress concentration factor (SCF) of five (5), per NB-3222.4(e)(2), was applied to amplify the stress intensity ranges before calculating the cumulative usage factor (CUF). In lieu of a highly refined stress analysis, this SCF accounts for the uncertainties in the load and stress distribution in the vicinity of the tapped holes. The NRC staff has evaluated the analysis and finds it acceptable.

These analyses demonstrate that stresses under all service conditions do not exceed the code allowables as stated in ASME Section III Subsection NB, and that the CUF of the modified pressurizer bottom head does not exceed the NB-3222.4 limit of 1.0. The NRC staff concludes that the applicable ASME Section III Code requirements are met by the PVNGS MNSA design and installation criteria, and that these MNSAs can remain in operation for the period, not to exceed two operating cycles.

APS also provided an evaluation to address potential corrosion of the nozzle bore holes, corrosion of the pipe outside diameter (O.D.) surface, galvanic corrosion, and stress corrosion cracking (SCC) of the MNSA fasteners. The results of this evaluation are summarized as follows:

- Laboratory corrosion data and service experience indicate that any corrosion of the carbon steel in the pressurizer Alloy 600 nozzle holes will be minor and will not affect the requested duration of the MNSA repair (i.e., not to exceed two cycles).

- Boric acid corrosion of the materials of construction for the MNSA and the O.D. piping surfaces have been addressed by testing and analysis. With the inspections currently performed, a leaking MNSA would be detected before significant corrosion of the piping occurs.

- There is no history of galvanic corrosion problems in similar applications where carbon steel is in contact with a Grafoil seal. This particular combination is used in other applications where the low alloy (or carbon steel) is frequently inspected (for example, steam generator secondary side manway and hand hole applications). The MNSA application is similar (i.e., Grafoil material is in contact with carbon steel and inspections will be conducted at each refueling outage) and for these reasons significant galvanic corrosion is not expected. In addition, the Grafoil used in the MNSA is Grade GTJ, which has been treated with ammonium phosphate to inhibit corrosion. The corrosion protection provided by this inhibitor is comparable to sacrificial inhibitors such as zinc or aluminum. Testing has shown that GTJ Grafoil significantly reduces the galvanic corrosion process. The licensee also noted that, in the absence of leakage past the Grafoil seal, the annulus will become stagnant and will not allow replenishment of the boric acid or oxygen.

- Testing in pressurized water reactor environments and concentrated boric acid solutions and service experience indicate that A-286 bolts in the MNSA application will operate indefinitely without SCC failures under normal conditions. If the MNSA device leaks, the bolts may be exposed to borated water or steam under conditions in which deposits or slurries will develop. Under these conditions and at stress levels present in the MNSA application, these bolts will operate satisfactorily for more than one fuel cycle. A leaking MNSA will be discovered and repaired as part of the walk-down inspections performed in response to Generic Letter 88-05, *Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants*. These walk-down inspections are performed prior to entering unit outages. Therefore, the existence of leaking MNSA conditions would be limited to one cycle.

Based on the above evaluation of potential corrosion effects, the NRC staff concludes that there are no significant corrosion issues associated with the application of the mechanical nozzle seal assemblies to pressurizer piping at Palo Verde. The data indicates that corrosion of the nozzle hole will be acceptable over the requested two-cycle period of use.

APS has committed to the following actions should MNSAs need to be utilized in any of the Palo Verde units.

(1) As required by IWA-4820, a VT-1 preservice inspection will be performed on all MNSA installations in accordance with IWB-2200.

(2) During plant startup (Mode 3) after initial MNSA installation and during subsequent plant restarts following outages, the pressurizer heater sleeve MNSAs will be pressure tested and inspected for leakage. To ensure quality of installation and continued operation with the absence of leakage, a pressure test with visual inspection will be performed on each of the installed MNSAs with the insulation removed. The test will be performed as part of plant re-start and will be conducted at normal operating pressure with the test temperature determined in accordance with the PVNGS Pressure and Temperature Limits as stated in the PVNGS Technical Specifications. Additionally, VT-3 exams will be performed to verify general structural and mechanical condition of the MNSAs.

(3) To ensure quality of installation and continued operation with the absence of leakage, a pressure test with visual inspection will be performed on each of the installed MNSAs with the insulation removed. The test will be performed as part of plant restart and will be conducted at normal operating pressure with the test temperature determined in accordance with the Palo Verde pressure and temperature limits as stated in the Palo Verde Technical Specifications.

(4) This request for alternative is for up to two cycles of operation. Prior to exceeding two operating cycles, installed MNSAs will be removed and appropriate repair or replacement activities will be implemented.

(5) APS will verify pipe wall thickness prior to machining MNSA bolt holes to further assure that adequate pipe wall reinforcement exists.

The NRC staff has reviewed the above licensee commitments and concludes that they are sufficient to assure proper installation and operation of the MNSAs for their intended use and duration.

4.0 CONCLUSION

Section 50.55a(a)(3) of Title 10 of the *Code of Federal Regulations* states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if "(i) The proposed alternatives would provide an acceptable level of quality and safety, or (ii) Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety." The NRC staff concludes that, pursuant to 10 CFR 50.55a(a)(3)(i), the use of MNSAs as an alternate to an ASME Section XI Code repair on any leaking pressurizer heater sleeves of the type describe above is authorized for a period not to exceed two operating cycles, because its installation will temporarily provide an acceptable level of quality and safety.

Principal Contributors: J. Medoff
M. Hartzman

Date: October 1, 2001

5.0 REFERENCES

1. Letter from D. Mauldin, Vice President - Nuclear Engineering and Support, Arizona Public Service Company, to the U.S. Nuclear Regulatory Commission Document Control Desk, “Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, Docket Nos. STN 50-528/529/530, Request for Code Alternative for the Use of Mechanical Nozzle Seal Assemblies,” dated September 24, 1999.

2. Letter from William H. Bateman, Project Director - Project Directorate IV-2, Division of Reactor Projects III/IV, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, to H. B. Ray, Executive Vice President, Southern California Edison Company, “Use of the Mechanical Nozzle Seal Assemblies for the San Onofre Nuclear Generation Station, Units 2 and 3 (TAC Nos. M99558 and M99559),” dated February 17, 1998.

3. Letter from William H. Bateman, Project Director - Project Directorate IV-2, Division of Reactor Projects III/IV, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, to H. B. Ray, Executive Vice President, Southern California Edison Company, “Use of the Mechanical Nozzle Seal Assembly for the San Onofre Nuclear Generation Station, Units 2 and 3 (TAC Nos. MA1776and MA1777),” dated January 29, 1999.

4. Letter from G. F. Dick, Acting Director - Project Directorate IV-1, Division of Licensing Project Management, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, to C. M. Dugger, Vice President - Operations, Entergy Operations, Inc., “Use of the Mechanical Nozzle Seal Assemblies at Waterford Steam Electric Station, Unit 3 (TAC No. MA4952),” dated March 25, 1999.

5. Letter from R. A. Gramm, Chief - Section 1, Project Directorate IV and Decommissioning, Division of Licensing Project Management, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, to C. M. Dugger, Vice President - Operations, Entergy Operations, Inc., “Waterford Steam Electric Station, Unit 3 RE: Relief Request to Permit Installation of Mechanical Nozzle Seal Assemblies (TAC No. MA4952),” dated March 25, 1999.

6. Letter from S. Dembek, Chief - Section 2, Project Directorate IV and Decommissioning, Division of Licensing Project Management, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, to G. R. Overbeck, Senior Vice President - Nuclear, Arizona Public Service Company, “Palo Verde Nuclear Generating Station, Units 1, 2, and 3 - Use of Mechanical Nozzle Seal Assemblies (TAC Nos. MA7737, MA7738, and MA7740),” dated March 16, 2000.

7. Letter W3F1-2000-0158 from E. P. Perkins, Director - Nuclear Safety Assurance, Entergy Operations, Inc., to the U.S. Nuclear Regulatory Commission Document Control Desk, “Waterford 3 SES, Docket No. 50-382, License No. NPF-38, Reporting of Licensee Event Report,” with attached Waterford Steam Electric Station, Unit 3, Licensee Event Report No. 00-011-00, dated November 16, 2000.