September 25, 2000

Mr. Gregg R. Overbeck
Senior Vice President, Nuclear
Arizona Public Service Company
P. O. Box 52034
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNIT 2 - EVALUATION OF A REQUEST FOR RELIEF ASSOCIATED WITH THE FIRST 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NO. MA9408)

Dear Mr. Overbeck:

We have reviewed and evaluated the information provided by Arizona Public Service Company in its letter dated March 20, 2000, proposing a request for relief associated with the first 10-year inservice inspection (ISI) interval for the Palo Verde Nuclear Generating Station, Unit 2.

We have determined that compliance with the specific code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The alternative provides reasonable assurance of structural integrity of the reactor vessel for the first 10-year ISI interval and, therefore, Relief Request No. 16 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii). The staff's safety evaluation is enclosed.

The scheduler requirements for submitting requests for relief, after the 10-year ISI interval has ended, are provided in 10 CFR 50.55a(g)(5)(iv). It states:

> Where an examination requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice test program as permitted by paragraph (g)(4) of this section, the basis for this determination must be demonstrated to the satisfaction of the Commission not later than 12 months after the expiration of the initial 120-month period of operation from start of facility commercial operation and each subsequent 120-month period of operation during which the examination is determined to be impractical.

The first 10-year ISI interval for Palo Verde Unit 2 ended on March 17, 1998, and the licensee's March 20, 2000, letter requesting this request for relief substantially exceeded the 12 month period allowed by this regulation. This issue is not related to the technical justification for the request for relief, and will be resolved separately through the Commission's inspection process.

Sincerely,

/RA/

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

Docket No. STN 50-529

Enclosure: Safety Evaluation

cc w/encl: See next page

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cc:

Mr. Steve Olea
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

Douglas Kent Porter
Senior Counsel
Southern California Edison Company
Law Department, Generation Resources
P.O. Box 800
Rosemead, CA 91770

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 40
Buckeye, AZ 85326

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Harris Tower & Pavillion
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Chairman
Maricopa County Board of Supervisors
301 W. Jefferson, 10th Floor
Phoenix, AZ 85003

Mr. Aubrey V. Godwin, Director
Arizona Radiation Regulatory Agency
4814 South 40 Street
Phoenix, AZ 85040

Ms. Angela K. Krainik, Director
Regulatory Affairs
Arizona Public Service Company
P.O. Box 52034
Phoenix, AZ 85072-2034

Mr. John C. Horne
Vice President, Power Generation
El Paso Electric Company
2702 N. Third Street, Suite 3040
Phoenix, AZ 85004

Mr. David Summers
Public Service Company of New Mexico
414 Silver SW, #1206
Albuquerque, NM 87102

Mr. Jarlath Curran
Southern California Edison Company
5000 Pacific Coast Hwy Bldg DIN
San Clemente, CA 92672

Mr. Robert Henry
Salt River Project
6504 East Thomas Road
Scottsdale, AZ 85251

Terry Bassham, Esq.
General Counsel
El Paso Electric Company
123 W. Mills
El Paso, TX 79901

Mr. John Schumann
Los Angeles Department of Water & Power
Southern California Public Power Authority
P.O. Box 51111, Room 1255-C
Los Angeles, CA 90051-0100

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PLAN

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNIT 2

DOCKET NO. STN 50-529

1.0 INTRODUCTION

By letter dated March 20, 2000, the Arizona Public Service Company (the licensee) submitted a request for relief for the first 10-year interval inservice inspection (ISI) for Palo Verde Nuclear Generating Station (Palo Verde or PVNGS), Unit 2. This request for relief, No. 16, was identified by the licensee in preparation of the final revision of the Unit 1 first 10-year ISI program.

In its letter dated April 14, 2000, the NRC approved the previously submitted requests for relief, through No. 15, for the first 10-year ISI interval for Palo Verde Unit 2.

2.0 BACKGROUND

Inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Paragraph 50.55a(a)(3) of 10 CFR Part 50 states in part 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 would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. Based on this, the required code of record for the Palo Verde Unit 2 first 10-year ISI interval is the 1980 Edition through Winter 1981 Addenda of Section XI of the ASME B&PV Code. The components (including supports) may meet the

requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

3.0 EVALUATION

Request for Relief No. 16, Restricted Access Under Reactor Vessel for VT-2 Examination

Code Class: 1
Reference: ASME Section XI, Division 1, 1980 Edition, Winter 1981 Addenda, IWB-5210 and Table IWB-2500-1
Component: Reactor Vessel
Requirement: IWB-5210 and Table IWB-2500-1 of ASME Section XI require that the reactor vessel [Category B-P, Item Nos. B15.10 and B15.11] be VT-2 examined at a test pressure not less than the nominal operating pressure associated with 100 percent rated reactor power, to identify leakage.

Licensee's Proposed Alternative

The licensee proposes the following:

> PVNGS will conduct a VT-2 examinations on all portions of the reactor vessel, which are accessible during Mode 3 without endangering personnel from undue heat or radiation exposure.
>
> However, in lieu of performing VT-2 visual exams in areas that are hazardous to personnel (i.e. under the reactor vessel), PVNGS will monitor for reactor vessel leakage using leak detection methods provided in the design of the plant.

Licensee's Basis for Relief

The licensee provided the following basis for its request for relief.

> The requirement to VT-2 examine the reactor vessel is to ensure that the vessel has been reassembled correctly and that no leakage is present. Because the walls of the reactor vessel are essentially vertical, the code allows the examination to be limited to the lowest elevation where leakage will accumulate [IWA-5242(a)]. In addition the code requires that the surrounding areas, including floor areas, be inspected for evidence of leakage [IWA-5242(b)].

PVNGS cannot comply with the code requirements to perform this inspection in Mode 3 because of high area temperatures and high radiation areas.

The exams require personnel to access areas where radiation fields are between 2 to 12 Rem/hour.

Accessing the bottom of the reactor vessel to assess accumulated leakage while the system is depressurized is possible. However, PVNGS is constructed in such a way that reactor vessel leakage which would accumulate at the bottom of the insulation around the vessel or on the floor cannot be distinguished from leakage from other sources such as leakage from the pool seals.

While direct visual examination may detect gross leakage, more sensitive methods of detecting leakage from the reactor vessel are available, as discussed below, which do not endanger plant personnel.

Reactor coolant system (RCS) pressure boundary leakage is monitored by the control room staff in several different ways:

1. Monitoring of the space between the double O-ring seal on the reactor vessel closure head.
2. Containment atmosphere particulate radioactivity monitoring.
3. Containment atmosphere gaseous radioactivity monitoring.
4. Containment relative humidity monitoring.
5. Containment sump level rate of change and discharge monitoring.
6. RCS water inventory balance measurements.

Technical Specification 3.4.14, RCS Operation Leakage, allows for only 1 gpm unidentified leakage and no pressure boundary leakage. The first four methods above, provide continuous monitoring with alarms. Sump levels are monitored every hour and the RCS water inventory balance is performed every three days. If greater than 1 gpm leakage is detected, the leakage must be reduced to within limits within four hours or the plant must be placed in Mode 5 within 36 hours.

PVNGS believes that the RCS leakage monitoring performed by the control room staff satisfies the requirement for detection of RCS pressure boundary leakage from the reactor vessel. Performing a VT-2 exam on the bottom of the reactor vessel would not provide better information than is possible by other means and does not warrant the risk of injury to plant personnel from extreme heat and high radiation exposure.

Staff Evaluation

The staff has evaluated the licensee's basis for relief in Relief Request No.16 concerning restricted access under the reactor vessel for VT-2 visual examination at the bottom of the reactor vessel. The licensee states that the VT-2 visual examination during a system hydrostatic test or system leakage test is conducted during Mode 3 (hot standby) when the temperature inside the cubicle in the vicinity of the reactor vessel bottom head is in the neighborhood of 500 degrees F with radiation levels of 2 to 12 rems per hour. Thus, the

performance of direct visual examination for detection of gross leakage as required during VT-2 examination is a hardship under conditions of high temperature and radiation levels. The licensee has proposed an alternative to a VT-2 examination for reactor vessel leakage using leak detection procedures and methods provided in the design of the plant. These include monitoring the space between the double O-ring seal on the closure head, containment atmosphere particulate radioactivity monitoring, containment atmosphere gaseous radioactivity monitoring, containment relative humidity monitoring and containment sump level rate of change and discharge monitoring, and RCS water inventory balance measurements. In addition, the licensee will conduct VT-2 visual examinations on all portions of the reactor vessel which are accessible during Mode 3 without endangering personnel from undue heat or radiation exposure. The combination of these examinations and monitoring methods should detect any significant reactor vessel leakage and provide reasonable assurance of continued pressure boundary leakage integrity. Based on the burden associated with performing the Code-required pressure testing on the reactor vessel, the licensee's proposed alternative monitoring methods, and because the first 10-year interval was completed without encountering any significant leakage, the proposed alternative examination is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), since the imposition of the code requirements would result in hardship or unusual difficulty without a compensating increase in quality and safety.

However, the staff has identified two issues that will have to be addressed prior to the use of this request for relief during future Unit 2 refueling outages. These issues are as follows:

1. Appendix G to 10 CFR Part 50 requires that the VT-2 examination of the reactor vessel be completed prior to the reactor core becoming critical. The purpose of this requirement is to ensure that the reactor vessel boundary is leak tight prior to criticality rather than to bring the reactor to criticality and subsequently verify its leak tightness. It appears that while some of the six different methods proposed by the licensee as an alternative to the VT-2 examination are capable of providing leakage monitoring prior to reaching Mode 2, this information was not addressed in Relief Request 16.

2. As the licensee indicated, the purpose of the ASME Code requirement and of the technical specifications for RCS operational leakage is to ensure that there is no pressure boundary leakage. The purpose of this inspection should also be to ensure that vessel bottom head instrument lines are not experiencing leakage and to ensure that boric acid corrosion is not taking place. The licensee's request for relief addresses various methods for detection of leakage but does not indicate how the location of potential leakage would be identified and what actions would be taken and when if leakage were detected. Relief Request 16 did not address how the proposed alternative would address the above-stated purposes for performing a VT-2 examination of the vessel.

If the licensee intends to rely on a similar alternative in the future for Unit 2 during the second 10-year interval, these issues will have to be addressed in writing as part of a request for approval.

4.0 CONCLUSION

The staff concludes that compliance with the specified code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The staff concludes that the alternative provides reasonable assurance of structural integrity of the reactor vessel for the first 10-year ISI interval, and is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

The ISI program request for relief is granted only for the closure of the first 10-year ISI interval for Palo Verde Unit 2.

Principal Contributor: M. Fields

Date: September 25, 2000