October 9, 2003

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, UNITS 1, 2, AND 3 - RELIEF REQUEST NO. 23, REVISION 1: ALTERNATIVE TO INSERVICE INSPECTION PROGRAM SURFACE EXAMINATION REQUIREMENTS (TAC NOS. MC0830, MC0831 AND MC0832)

Dear Mr. Overbeck:

By letter dated September 16, 2003, as supplemented by letter dated September 26, 2003, you submitted Revision 1 to Relief Request No. 23, requesting relief from requirements in the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (the ASME Code) for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3. In your request, you proposed an alternative to the surface examination requirements of ASME Code Section XI Section IWA-4533. In your request, you propose to be able to use the magnetic particle technique as an alternative to the liquid penetrant technique specified in Section IWA-4533 to conduct surface examinations of the preheated band area related to the pressurizer heater sleeve repair effort.

Based on the enclosed Safety Evaluation, the NRC staff concludes that the proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to Section 10 CFR 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations*, the NRC staff authorizes the proposed alternative in Relief Request 23, Revision 1, to the surface examination requirements of ASME Code Section XI Section IWA-4533 at the Palo Verde Nuclear Generating Station, Units 1, 2, and 3 for the second 10-year inservice inspection interval.

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: Safety Evaluation

cc w/encl: See next page

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Based on the enclosed Safety Evaluation, the NRC staff concludes that the proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to Section 10 CFR 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations*, the NRC staff authorizes the proposed alternative in Relief Request 23, Revision 1, to the surface examination requirements of ASME Code Section XI Section IWA-4533 at the Palo Verde Nuclear Generating Station, Units 1, 2, and 3 for the second 10-year inservice inspection interval.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM RELIEF REQUEST NO. 23, REVISION 1

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

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

DOCKET NOS. STN 50-528, STN 50-529, AND STN 50-530

1.0 INTRODUCTION

The Inservice Inspection (ISI) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 10 CFR 50.55a(a)(3) of Title 10 of the *Code of Federal Regulations* (10 CFR), states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (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) will 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. The ISI code of record for Palo Verde Nuclear Generating Station, Units 1, 2, and 3 second 10-year ISI interval is the 1992 Edition, 1992 Addenda of Section XI of the ASME Code.

By letter dated September 16, 2003, as supplemented by letter dated September 26, 2003, Arizona Public Service (APS or the licensee) submitted Revision 1 to Relief Request No. 23, requesting relief from requirements in the ASME Code for the Palo Verde units. The licensee proposed an alternative to the surface examination requirements of ASME Code Section XI Section IWA-4533. Specifically, the licensee proposes to be able to use the magnetic particle technique as an alternative to the liquid penetrant technique specified in Section IWA-4533 to conduct surface examinations of the preheated band area related to the pressurizer heater sleeve repair effort.

2.0 INSERVICE INSPECTION PROGRAM RELIEF REQUEST 23, REVISION 1, ALTERNATIVE TO ISI SURFACE EXAMINATION REQUIREMENTS

2.1 ASME Code Component Affected

System: Reactor Coolant
Component: Pressurizer
Code Class: 1

2.2 Code Requirements for which Relief is Requested

As stated by the licensee in Section III of the enclosure to its letter dated September 16, 2003:

> Section XI, 1992 Edition, 1992 Addenda, IWA-4533 states that the weld repair as well as the preheated band shall be examined by the liquid penetrant method after the completed weld has been at ambient temperature for at least 48 hr.

2.3 Licensee's Proposed Alternative to Code

As stated by the licensee in Section IV of the enclosure to its letter dated September 16, 2003:

> Pursuant to 10 CFR 50.55a(a)(3)(i), APS proposes alternatives to the requirements of IWA-4533 of ASME Section XI. Specifically, APS is requesting to have the option to use an alternate surface examination, such as magnetic particle (MT), for the examination of the preheated band area instead of being required to use the liquid penetrant (PT) examination.

2.4 Licensee's Basis for Relief

As stated by the licensee in Section V of the enclosure to its letter dated September 16, 2003:

> IWA-4533 specifically requires a PT examination of the preheated band. An MT examination is preferred by APS for the proposed application due to time and dose considerations. Liquid penetrant requires several steps: cleaning and surface preparation, drying, application of the penetrant, dwell time of the penetrant, cleaning of the penetrant, drying, application of the developer, developing time, reading the results, and post cleaning. Magnetic Particle examination can be performed on the "as-found" surface in a one-step process with immediate results and minimal post examination cleaning. As an example of the alternative requested, Code Case N-638 allows the final weld surface and the band around the weld surface to be examined using surface and ultrasonic methods and does not specify what type of surface exam should be performed.
>
> A change to the previously approved alternative (ultrasonic examination of the pad build-up) in lieu of the IWA-4533 required radiographic examination is not being requested.
>
> Since the pressurizer head is manufactured from low alloy carbon steel, it can be effectively examined using MT methods. Magnetic particle testing is an effective

surface examination for low alloy carbon steel. Penetrant testing will locate defects which are open to the surface. However, not only does MT require fewer steps and less surface preparation, it also provides surface and sub surface flaw detection. A reduction in dose could be realized by using MT verses PT in the post weld examination process, since the MT process can be performed in less time than the PT process.

The licensee clarified in its supplemental letter dated September 26, 2003, that the alternative examination proposed (the magnetic particle method) would be limited to the surface examination of the preheated band area of the pressurizer (P3 material). All other required post weld repair examinations would be performed in accordance with ASME Code requirements (i.e., the required liquid penetrant examination of the final weld surface will be performed in accordance with paragraph IWA-4533 of ASME Section XI).

3.0 STAFF EVALUATION

According to ASME Section XI, both magnetic particle examination and liquid penetrant examination techniques are classified as effective surface examination techniques. Although IWA-4533 states that the weld repair as well as the preheated band shall be examined by the liquid penetrant method, the intent of this paragraph is to ensure, through a qualified surface examination technique, that clean sound metal is present which is essential for maintaining structural integrity. The reason that only the liquid penetrant technique was referred to in this code requirement is because non-ferritic weld material is used for weld repairs of dissimilar materials, and this type of weld material cannot be effectively examined with the magnetic particle method. The preheated band that is the subject of this relief request is the section of the pressurizer that immediately surrounds the weld repair, which is made of low alloy steel. The staff agrees with the licensee that magnetic particle examination is an effective surface examination for carbon and low alloy steel base materials. Magnetic particle examination has the capabilities of delineating surface and subsurface indications. The liquid penetrant examination can only identify indications that are open to the surface.

Therefore, the staff finds that the proposed alternative to the requirements of IWA-4533 of ASME Section XI provides an acceptable level of quality and safety. Specifically, the staff finds acceptable the licensee's request to have the option to use the magnetic particle method for the examination of the preheated band area, instead of being required to use the liquid penetrant examination. The final examination of the weld pad build-up surface (which is not a magnetic material) on the pressurizer, shall be performed using liquid penetrant method in accordance with the stated requirements of IWA-4533.

While not directly related to the staff's finding that the proposed alternative provides an acceptable level of quality and safety, the magnetic particle examination technique can be performed in less time than the liquid penetrant examination. This will result in lower radiation doses to the individuals performing the surface examinations, which is consistent with 10 CFR 20.1101(b) principles, to achieve occupational doses that are as low as is reasonably achievable.

4.0 CONCLUSION

The NRC staff concludes that the licensee's proposed alternative, to be able to use the magnetic particle technique to conduct surface examinations of the preheated band area related to the pressurizer heater sleeve repair effort, provides an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the use of the magnetic particle technique for this specific application only, at the Palo Verde Nuclear Generating Station, Units 1, 2 and 3 for the second 10-year ISI interval. Granting this alternative does not preclude the licensee from examining the preheated band area using the liquid penetrant technique specified in ASME Code Section IWA-4533.

All other requirements of the ASME Code, Section III and XI for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Cheruvenki

Date: October 9, 2003

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