



SOUTHERN CALIFORNIA
EDISON[®]

An EDISON INTERNATIONAL[®] Company

A. Edward Scherer
Manager of
Nuclear Regulatory Affairs

March 22, 2004

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

**Subject: Third Ten-Year Inservice Inspection (ISI) Interval Relief Request
ISI-3-11 Regarding American Society of Mechanical Engineers
(ASME) Boiler and Pressure Vessel Code Case N-638 Similar and
Dissimilar Metal Welding Using Ambient Temperature Machine Gas
Tungsten Arc Welding (GTAW) Temper Bead Technique to Support
Potential Pressurizer Nozzle Repairs.
San Onofre Nuclear Generating Station, Units 2 and 3**

Dear Sir or Madam,

This letter submits the Southern California Edison (SCE) Company's Relief Request ISI-3-11 to obtain permission to perform repair welding using the ambient temperature machine GTAW temper bead technique.

Based on recent industry experience regarding Alloy 600 nozzles, SCE is performing bare metal visual inspections of the pressurizer heater sleeves during the current San Onofre Nuclear Generating Station Unit 2 refueling outage, and will also perform these inspections during the upcoming Unit 3 refueling outage. As a result, SCE may need the option of using the ambient temperature machine GTAW temper bead technique in the event repairs are required for Alloy 600 heater and instrument nozzles and attachment welds.

SCE requests approval of this relief request as soon as possible. Should you have any questions, please contact Mr. Jack Rainsberry at (949) 368-7420.

Sincerely,

Enclosure

cc: B. S. Mallett, Regional Administrator, NRC Region IV
B. M. Pham, NRC Project Manager, San Onofre Units 2, and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

P.O. Box 128
San Clemente, CA 92674-0128
949-368-7501
Fax 949-368-7575

A047

ENCLOSURE

Relief Request ISI-3-11

**Request to use the Ambient Temperature Machine
GTAW Temper Bead Technique.**

**Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)**

Alternative Provides Acceptable Level of Quality and Safety

1.0 ASME Code Component Affected

The Pressurizer Vessel is an American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Subsection NB (Class 1) component. The following vessel nozzles are included in the scope of this relief request: Bottom Head Heater Sleeves, (Unit 2, 30 each, Unit 3, 29 each), Bottom Head Level Instrument Nozzles (two each per unit), and the Lower Shell Temperature Nozzle (one each, Unit 3 only). One Unit 3 heater sleeve and the temperature nozzle at Unit 2 have been previously repaired.

2.0 Applicable Code Edition and Addenda

The Construction Code of Record for the Pressurizer Vessel is ASME Section III, Subsection NB, 1971 Edition through the Summer 1971 Addenda

The Third Ten-Year Inservice Inspection Interval Code of Record, ASME Section XI, Division 1, 1995 Edition through the 1996 Addenda

3.0 Applicable Code Requirements

The topic of this relief request is repair welding on the P-Number 3 ferritic base material (SA-533 grade B) of the pressurizer in conjunction with repairs to degraded nozzles. The repair approach consists of replacing a degraded nozzle with a partial length Alloy 690 replacement that would be externally attached to the vessel. The external attachment requires a welded pad be deposited around the nozzle opening. A J-groove preparation is then machined into the pad around the opening for the replacement nozzle attachment weld. The weld pad deposit and attachment weld are performed with weld metal having chemistry essentially equivalent to the Alloy 690 replacement nozzle material. The application of the weld pad is a dissimilar material combination.

The primary ASME Code Section for welding on Code Classified components such as the Pressurizer is ASME Section XI. Article IWA-4000 contains the rules for repair/replacement activities such as welding.

3.0 Applicable Code Requirements (continued)

ASME XI, IWA-4410 (a) and (b) state that such activities shall be performed in accordance with the Owner's Requirements and the Original Construction Code, a later Edition and Addenda of the Construction Code, or Code Cases.

ASME III, NB-4622.1 states that all components or pieces of components shall be given a final postweld heat treatment (PWHT) at a temperature not less than specified in Table NB-4622.1-1, except where exempted in the table notes. Table NB-4622.1-1 specifies that the minimum PWHT holding temperature for P-Number 3 material is 1100°F.

ASME XI, IWA-4410(c) states that the alternate rules of IWA-4600 may be used for welding in lieu of the Construction Code requirements. IWA-4600 (b) states that the alternate welding methods of IWA-4630 may be used for welding dissimilar material combinations, as an alternative to Construction Code requirements, when postweld heat treatment is not to be performed.

REQUESTED RELIEF

SCE requests relief from the applicable ASME Code requirements and requests to use the rules of ASME XI Code Case N-638 (Reference 1), with exceptions noted and discussed in Section 5.0, below.

4.0 Reason for the Request

Repair welding per the Construction Code, ASME III, NB-4620, would require an 1100°F minimum postweld heat treatment. ASME Section XI provides an alternative to this Construction Code requirement. ASME XI, IWA-4630, which would eliminate the high temperature postweld heat treatment, would still require a 300°F preheat. Installation and subsequent removal of the electric resistance heating pads needed for preheat would require approximately 20 person hours per location. Based on the dose rates previously measured, this would result in an exposure estimate of approximately 1.5 person-rem for each location.

ASME Code Case N-638 (Reference 1) will permit the use of the Ambient Temperature Machine GTAW Temper Bead Technique for the repairs. This technique provides an acceptable level of quality and safety and eliminates the need to install and remove the electric resistance heating equipment that would otherwise be required if the alternative repair method in ASME XI, IWA-4630 were employed. Therefore, repairs could be performed with less personnel radiation exposure.

5.0 Proposed Alternative and Basis for Use

Proposed Alternative

SCE proposes to implement Code Case N-638 and meet all requirements of Code Case N-638, with the following exceptions:

- If needed, SCE will use this technique with the pressurizer drained.
- Examination Section (4.0)(e) states that ultrasonic examination acceptance criteria shall be per ASME XI, IWB-3000. To meet this Code Case N-638 requirement, SCE will use the acceptance criteria from the Construction Code, ASME III, NB-5330, which states that any discontinuity interpreted to be a crack or incomplete penetration are unacceptable regardless of discontinuity or signal amplitude.

Basis for Use

EPRI Report GC-111050, Ambient Temperature Preheat for Machine GTAW Temperbead Applications, (Reference 2) documents a comprehensive study performed on the proposed ambient temperbead process. The report establishes that GTAW is an inherently low hydrogen process regardless of the welding environment and therefore, requires no preheat or post weld bake steps for hydrogen removal.

The report concluded that no preheat or post weld bake above ambient temperature is required to achieve acceptable weld quality and heat affected zone impact toughness properties using the machine GTAW temperbead repair process and that this was accomplished without risk of hydrogen assisted (delayed) cracking. The basis for their conclusion was extensive documentation from numerous industry qualification tests.

Code Case N-638 has been accepted and approved for use by the NRC per Regulatory Guide 1.147, Revision 13 (Reference 3). However, the proposed repair methodology takes an exception to one of the Code Case requirements.

The reply section of Code Case N-638 did not clearly state the application for the Code Case. The reply section was clarified in Code Case N-638-1. Although the NRC has not approved Code Case N-638-1, it is identical to Code Case N-638 with the exception of the editorial changes made to the reply section of the Code Case.

5.0 Proposed Alternative and Basis for Use (continued)

Basis for Use (continued)

Code Case N-638 states "... without the specified preheat or post-weld heat treatment of the Construction Code, when it is impractical, for operational or radiological reasons, to drain the component, and without the nondestructive examination requirements..."

Code Case N-638-1 states "...without the specified preheat or post-weld heat treatment of the Construction Code, when it is impractical to drain the component or impractical for Radiological reasons. The nondestructive examination requirements..."

This editorial change does not affect the process of similar and dissimilar metal welding using ambient temperature machine GTAW temper bead welding.

Code Case N-638 specifies in the Examination Section, 4.0(e) to use the acceptance criteria of ASME XI, IWB-3000 for the ultrasonic examination. ASME XI, IWB-3000 refers to Table IWB-3410-1 for the acceptance standards to be applied for each Examination Category. The Examination Category for the pressurizer Heater Sleeves, Lower Level Nozzles and Temperature Nozzle is B-P, as established in the San Onofre Nuclear Generating Station (SONGS) Unit 2 and Unit 3 ISI programs. In accordance with Table IWB-3410-1, the only acceptance standard given for Examination Category B-P items is for a visual examination (VT-2) during the pressure test. There is no acceptance criterion for ultrasonic examination of Category B-P items specifically provided for in the Code Case.

The acceptance criteria in IWB-3000 (i.e., in Table IWB-3410-1) for some other examination categories than B-P permit cracks of certain sizes. The SONGS Construction Code acceptance standards (ASME III, NB-5330), on the other hand, state that any discontinuity interpreted to be a crack or incomplete penetration are unacceptable regardless of discontinuity or signal amplitude (i.e., no cracks are allowed). Therefore, to meet the Code Case N-638 requirement SCE will perform ultrasonic examination of the Category B-P repair welds performed per Code Case N-638, and will use the Construction Code ASME III, NB-5330 acceptance standard of no cracks allowed.

5.0 Proposed Alternative and Basis for Use (continued)

Basis for Use (continued)

Code Case N-638 has been accepted and approved for use by the NRC per Regulatory Guide 1.147, Revision 13 (Reference 3). Implementing the repairs as proposed using the ambient temperature machine GTAW temper bead technique will provide an acceptable level of quality and safety, as required by 10 CFR 50.55a(a)(3)(i).

6.0 Duration of Proposed Alternative

Relief is requested for the third inspection interval at SONGS Units 2 and 3, which is scheduled to end on August 17, 2013.

7.0 References

1. ASME Code Case N-638, Similar and Dissimilar Metal welding Using Ambient Temperature Machine GTAW Temper Bead Technique, Section XI, Division 1, Code Committee approval September 24, 1999
2. EPRI Report GC-111050, Ambient Temperature Preheat for Machine GTAW Temperbead Applications, November 1998
3. Regulatory Guide 1.147, Revision 13, Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1, June 2003