SOUTHERN CALIFORNIA
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Manager of
Nuclear Regulatory Affairs

December 3, 2003

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

Subject: **Docket Nos. 50-361 and 50-362**
Third Ten-Year Inservice Inspection (ISI) Interval Relief Request
ISI-3-8 Request to Use Alternative To ASME Code Rules For The Embedded Flaw Repair Process
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-3-8 to allow the use of the embedded flaw repair process as an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code.

SCE will be performing inspections as required by the February 11, 2003, NRC Order EA-03-009, "Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Head at Pressurized Water Reactors." SCE intends to use the embedded flaw repair process in the event repairs are required in the reactor pressure vessel head penetrations and/or the attachment welds.

Therefore, SCE requests NRC approval of Relief Request ISI-3-8 prior to February 9, 2004, when the next Unit 2 refueling outage is scheduled to begin.

Should you have any questions, please contact Mr. Jack Rainsberry, Manager, Plant Licensing 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

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ENCLOSURE

Relief Request ISI-3-8

Request To Use Alternative To ASME Code Rules For The Embedded Flaw Repair Process

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

Alternative Provides Acceptable Level of Quality and Safety

1.0 ASME Code Components Affected

The reactor pressure vessel head (RPVH), which includes control element drive mechanism (CEDM) penetrations, 91 each, In-Core Instrumentation (ICI) penetrations, 10 each, and one head vent penetration on each reactor pressure vessel head, is an American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Class 1 component.

2.0 Applicable Code Edition and Addenda

Reactor Vessel Construction Code, ASME Section III, 1971 Edition, through the Summer 1971 Addenda

Code of Record for Current (Third) Ten-Year Inservice Inspection (ISI) Interval, ASME Section XI, 1995 Edition, through the 1996 Addenda

3.0 Applicable Code Requirements

ASME XI, IWA-4410(a) states the repair/replacement activities, such as metal removal and welding, shall be performed in accordance with the Owner's Requirements and the original Construction Code of the component or system. The applicable Construction Code is ASME III, 1971 Edition, through the Summer 1971 Addenda.

BASE METAL DEFECT REPAIRS

ASME III, NB-4131 states that defects in base metals, such as the RPVH penetration tubes, may be eliminated or repaired by welding, provided the defects are removed, repaired and examined in accordance with the requirements of NB-2500.

ASME III, NB-2538 addresses elimination of base material surface defects and specifies defects are to be removed by grinding or machining. Defect removal must be verified by a magnetic particle or liquid penetrant examination using acceptance criteria of NB-2545 or NB-2546. If the removal process reduces the section thickness below the NB-3000 design thickness, then repair welding per NB-2539 is to be performed.

3.0 Applicable Code Requirements (continued)

ASME III, NB-2539.1 addresses removal of defects and requires defects be removed or reduced to an acceptable size by suitable mechanical or thermal methods.

ASME III, NB-2539.4 provides the rules for examination of the base material repair welds and specifies they shall be examined by the magnetic particle or liquid penetrant methods with acceptance criteria per NB-2545 and NB-2546. Additionally, if the depth of the repair cavity exceeds the lesser of 3/8" or 10% of the section thickness, the repair weld shall be examined by the radiographic method using the acceptance criteria of NB-5320.

WELD METAL DEFECT REPAIRS

ASME III, NB-4451 states defects in weld metal shall be eliminated and, when necessary, repaired per NB-4452 and NB-4453.

ASME III, NB-4452 addresses elimination of weld metal surface defects and specifies defects are to be removed by grinding or machining. Defect removal must be verified by a magnetic particle or liquid penetrant examination using acceptance criteria of NB-5340 or NB-5350. If the removal process reduces the section thickness below the NB-3000 design thickness, then repair welding per NB-4453 is to be performed.

ASME III, NB-4453.1 addresses removal of defects in welds and requires the defect removal be verified with magnetic particle or liquid penetrant examinations using acceptance criteria of NB-5340 or NB-5350, or in the case of partial penetration welds where the entire thickness of the weld is removed, and only a visual examination is required.

REQUESTED RELIEF

Relief is requested from the requirements of ASME XI, IWA-4410(a), to perform repairs on the RPVH penetrations per the rules of Construction Code.

Relief is requested from the requirements in ASME III, NB-4131, NB-2538 and NB-2539.1 to eliminate base material defects prior to repair welding.

3.0 Applicable Code Requirements (continued)

REQUESTED RELIEF

Relief is requested to use substitute examination methods in lieu of those specified in NB-2539.4 for the following cases:

- In the case of embedded flaw welds on the ID surface of the penetration tubes, eddy current and ultrasonic examinations will be performed on the overlay repair welds which are surface and volumetric examinations but are different methods than specified in NB-2539.4.

- In the case of embedded flaw welds on the OD surface of the penetration tubes, surface examinations using the liquid penetrant method will be performed on the overlay repair weld surface. Additionally, ultrasonic examinations of the repair weld volume will be performed from the ID surface opposite the overlay repair weld. The ultrasonic method is a different volumetric examination method than is specified in NB-2539.4.

Relief is requested from the requirements in ASME III, NB-4451, NB-4452 and NB-4453.1 to eliminate weld metal defects prior to repair welding.

4.0 Reason for the Request

Southern California Edison (SCE) Company will be performing RPVH inspections during refueling outages to meet the requirements of the February 11, 2003, NRC Order EA-03-009 (Reference 1). SCE is anticipating the potential need to use the embedded flaw repair process if flaws are identified during these inspections. The proposed embedded flaw process as described in the May 16, 2003 letter from Westinghouse to the NRC (Reference 2), NRC Safety Evaluation Report which approved the Westinghouse embedded flaw process (Reference 3), and the October 1, 2003, letter from Westinghouse to the NRC (Reference 4) provides an acceptable alternative to repair reactor vessel head penetrations (RVHP).

5.0 Proposed Alternative and Basis for Use

PROPOSED ALTERNATIVE

Design, implementation of repairs, and inspections will be consistent with the information contained in References 2, 3, and 4.

5.0 Proposed Alternative and Basis for Use (continued)

PROPOSED ALTERNATIVE (continued)

- The embedded flaw repair overlay welds on the penetration J-groove welds will consist of a minimum of 3 deposited layers.

- The embedded flaw repair overlay welds on the inside diameter (ID) and the outside diameter (OD) of the penetration tube material will consist of a minimum of 2 deposited layers of weld, consistent with Reference 4, to minimize welding induced residual stresses and material distortion. In the case of repairs on the ID surface, the 2 layer approach results in a reduced inlay excavation depth.

BASIS FOR USE

In the NRC Safety Evaluation Report (SER) (Reference 3) the NRC staff concluded that, subject to the conditions of the SER, the embedded flaw process proposed provides an acceptable level of quality and safety. It also concluded that the SER and technical report may be referenced by licensees.

In both cases of the ID and the OD overlay repair welds, the proposed substitute examination methods have been previously demonstrated to be adequate for flaw detection and sizing as shown in Reference 4.

The embedded flaw repair process is considered a permanent repair that will last through the useful life of the RPVH. As long as a primary water stress corrosion cracking (PWSCC) flaw remains isolated from the primary water environment the only known mechanism for any further potential propagation is fatigue. The calculated fatigue usage in this region is very low, because the reactor vessel head region is isolated from the transients that affect the hot leg or cold leg piping.

The thickness of the weld used to embed the flaw has been set to provide a permanent embedment of the flaw. The embedded flaw process imparts less residual stresses than weld repair following the complete removal of the flaw.

Since Alloy 52 (690) weldment is considered highly resistant to PWSCC, a new PWSCC crack should not initiate and grow through the Alloy 52 overlay to reconnect the primary water environment with the embedded flaw. The resistance of the alloy 690 material has been demonstrated by laboratory testing, and in approximately 10 years of operational service in steam generator tubes, where no PWSCC has been found.

5.0 Proposed Alternative and Basis for Use (continued)

BASIS FOR USE (continued)

Therefore, the embedded flaw repair process is considered to be an alternative to Code requirements that provides 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 in-service inspection interval at SONGS Units 2 and 3, which is scheduled to end on August 17, 2013.

7.0 Precedents

Letter from Stephen Dembeck (NRC) to G.R. Overbeck (APS) dated, September 25, 2003; Subject: "Palo Verde Nuclear Generating Station, Units 1, 2, and 3, - Relief Request NOS. 20 and 21 Re: Alternatives to Inservice Inspection Program Flaw Repair Requirements (TAC NOS. MB4498, MB4499, MB500, MB4645, MB4646, and MB4647)"

Letter From Richard J. Laufer (NRC) to L.W. Pearce (FENOC) dated May 14, 2003; Subject: "Beaver Valley Power Station, Units 1 and 2 – Evaluation of Inservice Inspection (ISI) Relief Request BV3-RV-04 (TAC Nos. MB8172 and MB8173)"

8.0 References

1. U. S. Nuclear Regulatory Commission (NRC) Order EA-03-009, "Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," dated February 11, 2003

2. Letter from H. A. Sepp (Westinghouse) to the Document Control Desk (NRC) dated May 16, 2003; Subject: Request for Review and Approval Westinghouse Topical Report WCAP 15987-P,"Technical Basis for the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations" (Proprietary) and WCAP-15987-NP (Non-proprietary)

3. Letter from H. N. Berkow, (NRC) to H. A. Sepp, (Westinghouse) dated July 3, 2003; Subject: "Acceptance for Referencing – Topical Report WCAP 15987-P, Revision 2, "Technical Basis of the Embedded Flaw Process for Repair of Reactor Vessel Head Penetrations, (TAC No. MB8997)"

4. Letter LTR-NRC-03-61 from J. S. Galembush (Westinghouse) to Terrence Chan (NRC) and Bryan Benney (NRC) dated October 1, 2003; Subject: "Inspection of Embedded Flaw Repair of a J-groove Weld"