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A. Edward Scherer
Director
Nuclear Regulatory Affairs

February 27, 2009

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-3-29, Reactor Vessel Head Inspection
San Onofre Nuclear Generating Station, Units 2 and 3

Dear Sir or Madam,

Pursuant to 10 CFR 50.55a(g)(5)(iii), Southern California Edison (SCE) requests relief from the inspection coverage requirements of American Society of Mechanical Engineers (ASME) Code N-729-1 for San Onofre Nuclear Generating Station (SONGS) Unit 2 and Unit 3 for the third 10-year inservice inspection (ISI) interval.

As published in the Federal Register on September 10, 2008, NRC revised 10CFR50.55a to, in part, supersede the NRC First Revised Order EA-03-009 by referencing ASME Code Case N-729-1 in new paragraph 10 CFR50.55a(g)(6)(ii)(D). As discussed in the enclosed relief request the design of the SONGS reactor vessel head makes compliance with the inspection coverage requirements of Code Case N-729-1 impractical.

ISI-3-29 requests ASME Code relief that is similar to the relaxation requested from the NRC First Revised Order EA-03-009. Documentation of the relaxation requests and approval are listed in the Precedents and the References Sections of ISI-3-29.

SCE requests approval of the Enclosed Relief Request ISI-3-29 to support the return to service of SONGS Unit 2 from the Cycle 16 refueling outage. SCE currently anticipates that approval would be needed by January 23, 2010.

This letter and the enclosure contain no new commitments. In Section 7 of the enclosure SCE reiterates an existing commitment.

P.O. Box 128
San Clemente, CA 92674

Should you have any questions, please contact Ms. Linda T. Conklin at (949) 368-9443.

Sincerely,

Enclosure: as stated

cc: E. E. Collins, Regional Administrator, NRC Region IV
N. Kalyanam, NRC Project Manager, San Onofre Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 and 3

Enclosure

Relief Request ISI-3-29 Reactor Vessel Head Inspection in Accordance with 10 CFR 50.55a(g)(5)(iii) Inservice Inspection Impracticality

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1. ASME Code Component(s) Affected

SONGS Unit 2: Item No. B4.20, Ninety-one (91) Control Element Drive Mechanism (CEDM) penetrations - [Reactor Pressure Vessel Head Penetrations 1 through 91]

SONGS Unit 3: Item No. B4.20, Ninety-one (91) Control Element Drive Mechanism (CEDM) penetrations - [Reactor Pressure Vessel Head Penetrations 1 through 91]

All 91 CEDM nozzles in each Unit that are listed above are American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Class 1 components.

2. Applicable Code Edition and Addenda

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

The inspection requirement from which relief is being requested is ASME Code Case N-729-1, Figure 2, as conditionally required by 10 CFR 50.55a(g)(6)(ii)(D).

3. Applicable Code Requirement

The inspection requirement from which relief is being requested is the Base metal examination volume in Figure 2 of ASME Code Case N-729-1

4. Impracticality of Compliance

The requirements of ASME Code Case N-729-1 cannot be met for each CEDM nozzle due to the presence of a CEDM extension shaft guide cone threaded to the Interior Diameter (ID) surface. The same geometric limitations precluded meeting the volumetric coverage required by NRC First Revised Order EA-03-009 (Reference 1).

A drawing showing detailed dimensions of a CEDM penetration (SO23-901-213, Rev. 1) was provided as Attachment 1 to the letter from Southern California Edison (SCE) dated December 9, 2003 (Reference 2). In the discussions regarding distances below the J-groove weld, the J-groove weld is assumed to

include the associated fillet weld. A letter from SCE dated February 9, 2004 (Reference 3), provided additional information regarding the CEDM extension shaft guide cone threads in support of that relaxation request.

5. Burden Caused by Compliance

Compliance with this requirement requires the reactor vessel head to be redesigned. SONGS has ordered replacement heads for both Units 2 and 3 and currently plans to have them installed during the Cycle 17 refueling outages, currently scheduled to occur in the Fall of 2011 and 2012, respectively. SCE is working with the manufacturer of the new heads to incorporate design changes that would improve the area of inspection coverage in order to meet the requirements of ASME Code Case N-729-1.

6. Proposed Alternative and Basis for Use

SCE proposes to meet the inspection coverage requirements of dimension "a" in Code Case N-729-1, Figure 2, above the top of the attachment weld to as far down the nozzle as physically possible. This distance shall be at least the minimum inspection distance below the bottom of the attachment weld as follows:

CEDM # 1	.44 inches below the bottom of the weld
CEDM #'s 2 through 35	.43 inches below the bottom of the weld
CEDM #'s 36 through 87	.42 inches below the bottom of the weld
CEDM #'s 88 through 91	.35 inches below the bottom of the weld

The phenomenon of concern is primary water stress corrosion cracking (PWSCC), which typically initiates in the areas of highest stress. The area of CEDM penetrations that has the highest residual stress is the area adjacent to the J-groove attachment weld. Therefore, it is most probable that PWSCC will initiate adjacent to the J-groove attachment weld. PWSCC at or above the attachment weld resulting in pressure boundary leakage and the potential development of a safety concern (ejection of a nozzle or substantial corrosion of the low-alloy steel Reactor Pressure Vessel Head [RPVH]) prompted the NRC to issue Order EA-03-009. The inspections at San Onofre Nuclear Generating Station (SONGS) will ensure the integrity of the pressure boundary.

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In NRC reviews of relaxation requests from the superseded NRC First Revised Order EA-03-009 (See Precedents) for un-inspectable areas of RPV head penetrations, the NRC had requested that an analysis be performed to characterize the potential growth of postulated cracks in the un-inspected areas. This type of analysis was performed for SONGS Units 2 and 3 to support the Relaxation Requests. Results from the SONGS specific structural integrity evaluation of RPVH head penetrations were provided in the February 9, 2004, submittal (Reference 3). This submittal included Westinghouse Report WCAP-15819, Rev. 1, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: San Onofre Units 2 and 3" (Reference 4).

The minimum inspection distance below the weld that was approved (see Section 7 for Precedent) and is proposed for each CEDM nozzle is based on the Appendix C curves provided in WCAP-15819, Rev. 1.

The postulated initial crack for the WCAP-15819, Rev. 1, Appendix C curves extends from the expected lower extent of the inspection coverage area to the point where hoop stresses on either the ID or the OD become compressive. Appendix C crack growth curves use design weld sizes, which are conservative compared to the as-built weld sizes.

The minimum inspection coverage values that are requested are taken from the most conservative crack growth rate curves. These Appendix C curves support that a through-wall axial crack growing from minimum distance inspected for each CEDM below the weld would take at least one operating cycle to reach the bottom of the weld.

This does not include the time that would be required for an axial crack to propagate through the attachment weld and result in a leakage path. Additional operating time would be required for a safety concern (ejection of a nozzle or substantial corrosion of the low-alloy steel RPV head) to develop as a result of that leak. Therefore, multiple inspection intervals would be available to detect a flaw that initiates in the un-inspected region prior to potential development of a safety concern.

The threaded portion of the extension shaft guide cone would serve to retain potential loose parts resulting from a circumferential crack in the un-inspected area. A postulated 360-degree through wall crack in the narrow un-inspected annulus above the guide cone threads could result in separation of the guide cone from the penetration. However, in that case, the guide cone would be retained by the control element assembly (CEA) shroud and associated CEA extension shaft. This condition would not interfere with CEA function or any

other reactor coolant system function, and would be readily observed in the subsequent refueling outage.

Based on a review of data acquired during the Unit 2 and 3, Cycle 13 through Cycle 15 refueling outages, examination data can be collected from 2 inches above the top of the attachment weld to at least the requested minimum distances below the bottom of the attachment weld in all 91 CEDM penetrations. The proposed minimum inspection distance below the attachment weld provides at least one additional inspection interval to detect cracks propagating from the un-inspected area to the bottom of the weld and multiple inspection intervals would be available to detect cracks propagating from the un-inspected area before they could develop into a safety concern.

7. Duration of Proposed Alternative

The proposed alternative will apply to the existing RPVH for the remainder of the current SONGS Unit 2 and Unit 3 third 10-year ISI interval. The third 10-year interval began on August 18, 2003 and is scheduled to end on August 17, 2013.

As noted in the Precedents listed, WCAP-15819, Rev. 1 used the crack growth formula in the Electric Power Research Institute report, "Material Reliability Program (MRP) Crack Growth Rates for Evaluating Primary Stress Corrosion Cracking (PWSCC) of Thick Wall Alloy 600 Material (MRP-55), Revision 1;" therefore, the following commitment remains unchanged and in force.

> If the NRC staff finds that the crack-growth formula in industry report MRP-55 is unacceptable, then SCE will revise its analysis that supports the proposed alternative within 30 days after the NRC informs the licensee of an NRC-approved crack growth formula. If SCE's revised analysis shows that the crack growth acceptance criteria are exceeded prior to the end of the current operating cycle, SCE will consider Relaxation Request 3 to be rescinded, and within 72 hours, SCE will submit to the NRC written justification for continued operation. If the revised analysis shows that the crack growth acceptance criteria are exceeded during the subsequent operating cycle, SCE will, within 30 days, submit the revised analysis for the NRC review. If the revised analysis shows that the crack growth acceptance criteria are not exceeded during either the current operating cycle or the subsequent operating cycle, SCE will, within 30 days, submit a letter to the NRC confirming that its analysis has been revised. Any future crack-growth analyses performed for this and future cycles for RPV head penetrations will be based on a crack growth rate formula that is acceptable to the NRC.

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8. Precedents

1. Letter from Herbert N. Berkow (NRC) to H. B. Ray (SCE) dated March 19, 2004; Subject: Relaxation of the Requirements of Order EA-03-009 Regarding Reactor Pressure Vessel Head Inspections, San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 (TAC Nos. MC1542 and MC1543) [ML 040840128]

2. Letter from Herbert N. Berkow (NRC) to H. B. Ray (SCE) dated June 27, 2005; Subject: Relaxation of the Requirements of Order EA-03-009 Regarding Reactor Pressure Vessel Head Inspections, San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 - Relaxation Request 3 (TAC Nos. MC5522 and MC5523) [ML 051780416]

3. Letter from Jack Donohew (NRC) to H. B. Ray (SCE) dated September 26, 2005; Subject: San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, Re: Correction to Relaxation of the Requirements of Order EA-03-009 Regarding Reactor Pressure Vessel Head Inspections (TAC Nos. MC5522 and MC5523) [ML 052430666]

9. References

1. First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors, issued on February 20, 2004 [ML 040220181]

2. Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) Dated December 9, 2003; Subject: Docket Nos. 50-361 and 50-362, Request For Relaxation Of Reactor Pressure Vessel Head Penetration Inspection Requirements In Nuclear Regulatory Commission Order EA-03-009, San Onofre Nuclear Generating Station Units 2 and 3 [ML 033450462]

3. Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) Dated February 9, 2004; Subject: Response to NRC Request for Additional Information Regarding Relaxation Requests 1 and 2 for Reactor Pressure Vessel Head Penetration Inspection Requirements in Nuclear Regulatory Commission Order EA-03-009 for San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 (TAC Nos. MC1540, MC1541, MC1542, and MC1543) [ML 040500598]

4. Westinghouse Report WCAP-15819-P, Rev. 1, “Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: San Onofre Units 2 and 3”