

March 27, 2002

Mr. Harold B. Ray
Executive Vice President
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San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3 -
EVALUATION OF RELIEF FOR USE OF MECHANICAL NOZZLE ASSEMBLIES
AS AN ALTERNATE TO THE AMERICAN SOCIETY OF MECHANICAL
ENGINEERS (ASME) CODE REPAIRS
(TAC NOS. MB3547 AND MB3548)

Dear Mr. Ray:

By letter dated November 27, 2001, as supplemented by letter dated December 24, 2001, you requested interim relief from the ASME Code Section III requirements for Class 1 components to permit the use of mechanical nozzle seal assemblies (MNSAs) as an alternative repair method of reactor coolant system instrumentation nozzles at the San Onofre Nuclear Generating Station, Units 2 and 3. You made the request in accordance with the provisions of 10 CFR 50.55a(a)(3) and 10 CFR 50.55a(g)(5)(iii). You requested the interim relief through refueling outage (RFO) 12 for Units 2 and 3, scheduled for April 2002 and January 2003, respectively.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the subject relief request. The NRC Safety Evaluation is enclosed. Our evaluation concludes that the use of MNSAs (for Cycle 12 and ending with the Cycle 13 RFOs) will provide an acceptable level of quality and safety in that they will ensure pressure boundary integrity as installed and is, therefore, authorized pursuant to 10 CFR 50.55a(a)(3)(i).

Sincerely,

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

Docket Nos. 50-361 and 50-362

Enclosure: Safety Evaluation

cc w/encls: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO RELIEF FOR USE OF MECHANICAL NOZZLE ASSEMBLIES AS AN
ALTERNATE TO THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) CODE
REPAIRS AT SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3
SOUTHERN CALIFORNIA EDISON COMPANY
SAN DIEGO GAS AND ELECTRIC COMPANY
THE CITY OF RIVERSIDE, CALIFORNIA
THE CITY OF ANAHEIM, CALIFORNIA
DOCKET NOS. 50-361 AND 50-362

1.0 INTRODUCTION

1.1 Background

By letter dated November 27, 2001, (Ref. 1) and revised December 24, 2001, (Ref. 2) Southern California Edison (SCE or the licensee), requested interim relief from the ASME Code Section III requirements for Class 1 components to permit the use of mechanical nozzle seal assemblies (MNSAs) as an alternative repair method of reactor coolant system (RCS) instrumentation nozzles at the San Onofre Nuclear Generating Station (SONGS), Units 2 and 3. The licensee made the request in accordance with the provisions of 10 CFR 50.55a(a)(3) and 10 CFR 50.55a(g)(5)(iii). The licensee requested the interim relief through refueling outage (RFO) 12 for Units 2 and 3, scheduled for April 2002 and January 2003, respectively.

The licensee indicated (Ref. 1) that cycle-by-cycle interim approval would be requested for use of MNSAs. Following a phone conversation with the U.S. Nuclear Regulatory Commission (NRC) staff, the licensee revised the request to omit the removal of existing MNSAs and, contingent upon acceptable results of visual inspections, proposed to continue to use the currently installed MNSAs for Cycle 12. By its letter dated January 29, 1999 (Ref. 3), the NRC staff accepted and approved the installation of the MNSAs as temporary repairs of the RCS instrument nozzles, based on the commitments stated in References 1 and 2. The NRC staff's approval was contingent upon successful visual examination during the Cycle 12 RFO. This program was described in a licensee letter dated April 30, 1998 (Ref. 4).

1.2 SCE Request

The licensee submitted a request to permit an extension of the interim use of installed MNSAs at SONGS, Units 2 and 3, for the period of operation beginning with the cycle 12 RFO and ending with the Cycle 13 RFO. The original request (November 27, 2001) included the requirement to remove and examine existing MNSAs. The revised request (December 24, 2001) proposed to leave the MNSAs in place and to perform visual examinations.

2.0 EVALUATION

2.1 NRC Requirements

Section 10 CFR 50.55a(g)(4) of Title 10 of the *Code of Federal Regulations* (10 CFR) requires in part that "throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code, to the extent practical within the limitations of design, geometry, and materials of construction of components."

Section 10 CFR 50.55a(a)(3)(i) allows the Director of the Office of Nuclear Reactor Regulation to authorize alternatives to the requirements of Section XI of the ASME Code when an applicant can demonstrate that the alternative program will provide an acceptable level of quality and safety in lieu of complying with the requirements in Section XI.

2.2 Current Edition of the ASME Code Used for the Inservice Inspection (ISI) of ASME Code Class Components

The current ISI code of record for SCE is the 1989 Edition of Section XI to the ASME Code, no Addendum.

2.3 Code Requirements

- Section XI, IWA 7200, states that any item used for replacement shall meet the original Construction Code requirements.
- Section III of the ASME Code specifies requirements for Class 1 components as part of the reactor coolant pressure boundary.
- Section XI, IWB 2500-1, Examination Category B-G specifies requirements for VT-1 examination of the MNSA bolting materials for evidence of crack, wear, corrosion, erosion, or physical damage.
- Section XI, IWB 2500-1, Examination Category B-P specifies requirements for VT-2, system leak test examination to monitor for evidence of components pressure boundary leakage, distress, or corrosion.

2.4 Proposed Alternative Program

The NRC previously approved installation of MNSAs on the pressurizer instrument nozzles and steam generator channel head instrument nozzles as temporary alternative repair methods of cracked RCS instrumentation nozzles through the Cycle 12 RFO.

2.5 Staff Evaluation

By letters dated February 2, 2001, (Ref. 5) and April 16, 2001, (Ref. 6), the licensee reported the results of the visual inspections during the Cycle 11 RFO. SCE stated in these submittals that an examination of all MNSAs in SONGS Units 2 and 3 had been performed, and that the results of the inspection were satisfactory.

By letters dated May 24, 1999, (Ref. 7), and August 5, 1999, (Ref. 8), the licensee reported that feeler gauge measurements at two locations in one MNSA on the hot leg in SONGS, Unit 2 exceeded prescribed tolerances. The licensee performed an engineering evaluation and concluded that the condition was operable, and that the MNSA could perform its original design safety function. Nevertheless, in accordance with a commitment made in the April 30, 1998 letter (Ref. 3), the licensee replaced the two MNSAs on the hot leg with welded Alloy 690 nozzles. This replacement was recommended by letter dated July 11, 2000 (Ref. 9).

In a letter dated November 27, 2001, SCE stated that it intended to remove all MNSAs and to replace them with similar MNSAs during the Cycle 12 RFOs. The removed MNSAs were to be examined for any evidence of corrosion. The licensee intended to use the information gathered from this examination to support a request for permanent installation of the MNSAs on the pressurizer and the steam generator channel head instrument nozzles. The removal and examination of the MNSAs were an original condition stated in the NRC's safety evaluation (SE) January 29, 1999, as a condition to use the MNSAs for permanent installation. The examination for evidence of corrosion was instituted due to the lack of information available on Alloy 600 when the SE was written.

During the Cycle 10 refueling outage, SCE removed all MNSAs on the hot legs and replaced them with Alloy 690 nozzles, in accordance with its commitment to the NRC. SCE also removed and visually inspected the MNSAs on the pressurizer instrument nozzles and steam generator channel head instrument nozzles. Similarly, during the Cycle 11 refueling outage, SCE again visually inspected the MNSAs which were installed on the pressurizer instrument nozzles and steam generator channel head instrument nozzles. No leakage from the installed MNSAs was visually detected during these inspections. A summary of the visual examinations was reported in the required post-outage Owners Report of Inservice Inspection NIS-1 forms (Ref. 5) submitted by SCE, indicating that the results of these inspections were satisfactory.

The NRC staff was concerned that removal of the MNSAs could result in leakage. Therefore, the NRC staff recommended to the licensee in a phone conference that removal of the MNSAs was not warranted at this time and continued visual inspection would be sufficient for another cycle. The licensee amended its submittal by letter dated December 24, 2001 (Ref. 2) and

requested that the existing MNSAs be left in service for an additional operating cycle consistent with the NRC staff's recommendation.

MNSAs are bolted into holes drilled and tapped on the pressurizer outer surface. As such, these holes represent regions of high stress concentration, which affect the fatigue life of the pressurizer. A consideration in granting the requested relief is therefore the incremental fatigue that will accumulate over the requested interval. Based on a review of the ASME Section III NB-3200 (Ref. 10) fatigue analysis of the pressurizer bottom head (Ref. 11), the NRC staff concludes that the fatigue cumulative usage factor of the SONGS pressurizer will most likely not change significantly over the requested cycle of operation as a result of the MNSA bolt holes in the pressurizer wall. The NRC staff concludes that the pressurizer ASME Section III fatigue analysis will remain valid over the requested period of operation.

3.0 CONCLUSION

Based on the licensee's visual inspection results, the NRC staff finds the licensee's request to use the currently installed MNSAs on the steam generator and the pressurizer in Unit 2, and the MNSAs on the pressurizer in Unit 3, acceptable for the period of operation beginning with Cycle 12 and ending with the Cycle 13 RFOs. This finding is based on acceptable ASME Code VT-1 and VT-2 examinations, boric acid inspections, nozzle inspections, feeler gauge measurement of the top plate gap, and inspection of the condition of the locking tab washers and associated fasteners, and incremental fatigue that will accumulate over the requested interval. The use of MNSAs (for Cycle 12 and ending with the Cycle 13 RFOs) will provide an acceptable level of quality and safety in that they will ensure pressure boundary integrity as installed and is, therefore, authorized pursuant to 10 CFR 50.55a(a)(3)(i).

4.0 REFERENCES

1. Letter dated November 27, 2001, from A. E. Scherer, SCE, to the NRC Document Control Desk: Subject: Docket Nos. 50-361 and 50-362 Mechanical Nozzle Seal Assembly Code Replacement Request for Relief from 10 CFR 50.55a, San Onofre Nuclear Generating Station, Units 2 and 3.
2. Letter dated December 24, 2001, from A. E. Scherer, SCE, to the NRC Document Control Desk: Subject: Docket Nos. 50-361 and 50-362 Mechanical Nozzle Seal Assembly Code Replacement Request for Relief from 10 CFR 50.55a, San Onofre Nuclear Generating Station, Units 2 and 3.
3. Letter of January 29, 1999, from W. H. Bateman, NRC, to H. B. Ray, SCE, "Safety Evaluation for the Use of Mechanical Nozzle Seal Assemblies for the San Onofre Nuclear Generation Station, Units 2 and 3."
4. Letter of April 30, 1998, from J. L. Rainsberry, SCE, to NRC Document Control Desk: Subject: Docket Nos. 50-361 and 50-362, Use of the Mechanical Nozzle Seal Assembly, San Onofre Nuclear Generating Station, Units 2 and 3.

5. Letter of February 2, 2001, from A. E. Scherer, SCE, to the NRC Document Control Desk, with Owners Report of Service Inspection for SONGS Unit 2.
6. Letter of April 16, 2001, from A. E. Scherer, SCE, to the NRC Document Control Desk, with Owners Report of Service Inspection for SONGS Unit 3.
7. Letter of May 24, 1999, from A. E. Scherer, SCE, to the NRC Document Control Desk, with Owners Report of Service Inspection for SONGS Unit 2.
8. Letter of August 5, 1999, from A. E. Scherer, SCE, to the NRC Document Control Desk, with Owners Report of Service Inspection for SONGS Unit 3.
9. Letter of July 11, 2000, from S. Dembek, NRC, to H. B. Ray, SED, July 11, 2000.
10. ASME Boiler and Pressure Vessel Code, Section III for Nuclear Power Plant Components, 1971 Edition through 1972 Addenda, Division 1, Subsection NB, Class 1 Components.
11. ABB/CE Calculation A-SONGS-9416-1170 Rev. 00, "Evaluation of Attachment Locations for Mechanical Nozzle Seal Assemblies on SONGS Unit 3 Pressurizer, Shell and Bottom Head Instrumentation Nozzles," June 20, 1997 (Proprietary).

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