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January 15, 1986

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U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region V
1450 Maria Lane, Suite 210
Walnut Creek, California 94596-5368

Attention: Mr. John B. Martin, Regional Administrator

Dear Sir:

Subject: Docket No. 50-361 and 50-362
IE Bulletin No. 79-13, Rev. 2:
Cracking in Feedwater System Piping
San Onofre Nuclear Generating Station
Units 2 and 3

The subject bulletin required several inspections to be performed on the San Onofre Unit 2 feedwater system piping upon completion of the hot functional testing program (prior to fuel loading), as well as during the first refueling outage. Recently, a Southern California Edison (SCE) review of actions required by the subject bulletin for San Onofre Unit 2 identified inspections that had not been performed and reports which had not been submitted. The purpose of this letter is to review the history of the SCE program to comply with IE Bulletin 79-13, Rev. 2 requirements for San Onofre Units 2 and 3, provided in Enclosure (1), and to document that SCE has completed compliance with IE Bulletin 79-13, Rev. 2, provided in Enclosure (2).

Inspection Report 50-361/81-04 indicates that Region V considers Action Item (1) of this Bulletin to be closed for San Onofre Units 2 and 3. SCE now considers, based on Enclosure (2) to this letter, that all Action Items in this IE Bulletin 79-13, Rev. 2 have been completed for San Onofre Units 2 and 3.

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Mr. J. B. Martin

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If you have any questions or would like additional clarification, please contact Mr. T. D. Mercurio (818) 302-2645.

Subscribed on this 13th day of January, 1986.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By:

M. O. Medford
M. O. Medford
Manager Nuclear Licensing

Subscribed and sworn to before me this
13th day of January, 1986.

C. Sally Sebo
Notary Public in and for the County of
Los Angeles, State of California



My Commission Expires: Apr 14, 1986

Enclosures

cc: F. R. Huey (USNRC Senior Resident Inspector, Units 1, 2 and 3)
NRC Office of Inspection and Enforcement
Division of Inspection Programs
Washington D. C. 20555

Harry Rood (NRC) (to be opened by addressee only)

HISTORY OF THE SCE PROGRAM TO COMPLY WITH IE BULLETIN 79-13
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 AND 3

IE Bulletin 79-13 was transmitted to SCE by NRC letter dated June 25, 1979 on the dockets of both San Onofre Units 2 and 3. Actions required by this bulletin, however, were applicable only to holders of Operating Licenses (OL) issued by the NRC. SCE understood that the requirements of IE Bulletins intended for OL holders would be separately incorporated into the licensing process of NTOL facilities, and were therefore not applicable to units in the pre-fuel load, construction, and startup testing phase, unless explicitly specified therein. As stated in the June 25, 1979 NRC to SCE forwarding letter, no written response to the IE Bulletin 79-13 was required and no response to the original bulletin was therefore made on Dockets 50-361 and 50-362.

On August 30, 1979, the NRC issued Revision 1 to IE Bulletin 79-13, transmitted to SCE only on Docket 50-361, which included "Actions to be taken by Designated Applicants for Operating Licenses." These Actions were similar to those required of licensed facilities: i.e. performance of Non Destructive Examination (NDE) on steam generator feedwater nozzle and piping weld joints following completion of Hot Functional Testing (HFT) prior to fuel load (receipt of OL), and again during the first refueling outage. San Onofre Unit 2 was a "Designated Applicant" whereas San Onofre Unit 3 was not.

The original SCE response to Revision 1 of the Bulletin, dated September 19, 1979, suggested that examinations of these weld joints, which were required by the Bulletin to be conducted prior to receipt of the OL, were already included in the specification of construction and preservice NDE requirements for ASME Code, Sections III & XI weld joints. (These ASME weld joint examination requirements were not invoked on earlier generating facilities such as those named in the Bulletin.) In addition, SCE's position was that the increased inservice inspection requirements of such "Code" weld joints would satisfy the intent of the bulletin required inspections during the first refueling outage.

Revision 2 to IE Bulletin 79-13 was forwarded to SCE by NRC letter dated October 17, 1979 on the dockets of both San Onofre Units 2 and 3. Since San Onofre Units 2 and 3 were not yet licensed, the schedule for SCE to respond to Bulletin action requirements remained unchanged from Rev. 1 for San Onofre Units 2 and 3.

In an NRC to SCE letter dated November 14, 1979 on the dockets of both San Onofre Unit 2 and Unit 3, the NRC indicated that the inspection requirements of IE Bulletin 79-13 were in addition to preservice and inservice inspection requirements of the ASME Code. In the SCE response to the NRC November 14, 1979 letter, dated January 18, 1980, SCE stated that the basis for the bulletin was cracking occurring in steam generator feedwater nozzle weld joints of operating plants that were constructed under less stringent Code requirements and not subject to the current, more stringent, inservice inspection requirements of the ASME B&PV Code, Section XI. Therefore, SCE proposed that the ultrasonic (UT) examinations, required by Section XI, supplemented as necessary by radiographic (RT) examinations, would be sufficient to determine if stress corrosion cracking might be taking place in the heat affected zone of steam generator feedwater nozzle weld joints.

The NRC apparently took exception to this position, however, and in a March 4, 1980 SCE to NRC letter, the SCE to NRC letter of January 18, 1980 was retracted, and a commitment to full compliance with the inspection requirements specified in Revision 2 of IE Bulletin 79-13, was made.

The only commitment tracking system in use by SCE at that time was the NRC Action Item Requirement (NRCAIR) System, employed by Quality Assurance. The Quality Assurance organization tracked the pre-OL requirements of this commitment under NRCAIR F-NRC-156, Revision #1 dated January 16, 1981. A method established to close outstanding NRC commitments made prior to receipt of the OL's for San Onofre Units 2 and 3 included review of NRC inspection reports wherein verification of action completion in regard to such bulletins was documented by the NRC inspector. Because NRC Inspection Report 50-361/81-14 and 50-362/81-03 dated August 14, 1981, states "the action required by Bulletin 79-13 is considered complete for Unit 2," since Revision 1 of the Bulletin was transmitted to SCE only on the 50-361 Docket for Unit 2, and only San Onofre Unit 2 was listed in the attachment to both Rev. 1 and Rev. 2 of IE Bulletin 79-13, "Designated Applicants for Operating Licenses", the action being tracked was considered complete and this NRCAIR closed.

The recent SCE review indicates the above NRCAIR tracking system did not track commitments to be satisfied after receipt of the OL. Consequently, the performance and reporting of first refueling outage inspections required by IE Bulletin 79-13 were not entered into a tracking system. The Licensing Commitment List (LCL) had not yet been implemented for Units 2 and 3 at that time (March 1980).

The RT inspections required by IE Bulletin 79-13 Action Item 2.a. and some of the visual inspections required by Action Item 2.c. to be performed during the first refueling outage of Unit 2 were therefore not performed. Some UT inspections of weld joints on feedwater piping were performed at Unit 2 during the first refueling outage. However, these UT inspections were performed in accordance with ISI program requirements which did not include inspection of nozzle weld joints. All feedwater system snubbers in containment were visually inspected during the first Unit 2 refueling outage and were found to be operable which partially complied with Action Item 2.c visual inspection requirements. However, visual inspection of all the feedwater system pipe supports for operability and conformance to design and visual inspection of

snubbers for conformance to design were not conducted at that time. Because all the IE Bulletin Action Item No. 2 inspections were not performed during the first Unit 2 refueling outage, performance of the required inspections at Unit 3 during the recently completed first refueling outage has been substituted for Unit 2 inspections. All Action Item No. 2.a inspections have been performed at Unit 3 using the UT method during the recently completed Unit 3 refueling outage, and the results are that no cracking or unacceptable code discontinuities were found. All Action Item 2.c visual inspections have also been completed at Unit 3 during the recently completed Unit 3 refueling outage. The results of these UT examinations and visual inspections are maintained on file (via Quality Assurance Records) for audit and/or inspection at the San Onofre site.

The bases for the primary use of UT with RT as a supplement for the volumetric examinations are as follows:

1. In general, service-induced discontinuities such as the fatigue cracking which has occurred in some steam generator feedwater piping systems are of small volume and usually filled with corrosion products. As a result, the discontinuity has only a small density difference from the sound material surrounding it. Service-induced cracking tends to frequently change orientation and direction, following grain boundaries within the material rather than propagating in straight lines.
2. UT sensitivity is dependent more upon the elasticity of the material than the density, in that abrupt changes in the elastic properties of the material being examined act as an interface to reflect the ultrasonic energy. The material discontinuities provide precisely the variations in material elasticity detectable by UT.

The decision to use ultrasonics to perform these examinations was based on the above and is in accordance with current practice involving inservice inspections (i.e., the ASME Section XI ISI Program). UT affords flexibility in its application, allowing its use in almost any situation, compatible with ALARA considerations. The results of each examination can be readily compared with previous examinations, and where evaluation of the UT test results indicates the possibility of a significant flaw, RT would be used to verify the evaluation, as appropriate.

SUMMARY OF COMPLIANCE
IE BULLETIN 79-13, REVISION 2
SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3
DOCKET NOS. 50-361 AND 50-362

- References: (1) Letter from K. P. Baskin (SCE) to R. H. Engelken (NRC)
dated March 4, 1980, IE Bulletin 79-13
- (2) Letter from R. H. Engelken (NRC) to A. Arenal (SCE)
dated November 14, 1979, IE Bulletin 79-13
- (3) Letter from K. P. Baskin (SCE) to R. H. Engelken (NRC)
dated September 19, 1979, IE Bulletin 79-13

Actions To Be Taken By Designated Applicants For Operating Licenses:

Bulletin Item No. 1: Inspections After Completion of Hot Functional Test
Programs and Prior to Fuel Load

Bulletin Item 1.a.:

Action Required:

Perform radiographic examination, supplemented by ultrasonic examination as necessary to evaluate indications, of all feedwater nozzle-to-pipe welds and of adjacent pipe and nozzle areas (a distance equal to at least two wall thicknesses). Evaluation shall be in accordance with ASME Section III, Subsection NC, Article NC-5000. Radiography shall be performed to the 2T penetrameter sensitivity level, in lieu of Table NC-5111-1, with systems void of water.

Action Performed:

In Reference (1) SCE committed to implementing an inspection program of feedwater piping welds as required by Bulletin Item 1.a.. Accordingly, radiographic (RT) inspections of steam generator feedwater nozzle-to-pipe welds were performed at San Onofre Unit 2 after completion of the hot functional test program and prior to fuel loading. Even though not required by the Bulletin, these same inspections were also performed at Unit 3 after completion of the hot functional test program and prior to fuel loading. The Unit 2 and Unit 3 inspections were performed starting on April 29, 1981 and August 30, 1982, respectively. It was determined that no cracking or unacceptable code discontinuities existed.

Bulletin Item 1.b.:

Action Required:

In the event cracking is identified during examination of the nozzle-to-pipe weld, all feedwater line welds up to the first piping support or snubber outboard of the nozzle shall be volumetrically examined in accordance with Item 1.a. above. All unacceptable code discontinuities shall be subject to repair unless justification for continued operation is provided.

Action Performed:

Since no cracking or unacceptable code discontinuities were identified during the Bulletin Item 1.a. inspections, Bulletin Item 1.b. was not applicable and supplemental ultrasonic (UT) examinations were not performed.

Bulletin Item 1.c.:

Action Required:

Perform a visual inspection of feedwater system piping supports and snubbers in containment to verify operability and conformance to design.

Action Performed:

As committed to in Reference (3), visual examinations of feedwater system piping supports and snubbers were performed as part of the preservice inspection program. The results of these examinations have been provided by letter dated October 22, 1982, from Mr. J. M. Curran to Mr. R. H. Engelken. Additionally, during Power Ascension testing, as part of the Piping Verification Program, the feedwater system was visually checked. The results of these examinations have been provided by letter dated April 20, 1983, from Mr. H. B. Ray to Mr. J. B. Martin. Lastly, San Onofre Unit 2 employs a routine inservice inspection program (as described in FSAR Section 6.6). Results of the routine inservice inspection program examinations through April 17, 1985, have been provided by letter dated July 16, 1985, from Mr. H. E. Morgan to Mr. J. B. Martin.

Bulletin Item No. 2: First Refueling Outage Inspections

Bulletin Item 2.a.:

Action Required:

For steam generator designs with a common nozzle for both main and auxiliary feedwater systems, perform volumetric examination of the feedwater nozzle-to-pipe welds, the feedwater piping welds to the first support, and the feedwater line-to-containment penetration welds in accordance with Item 1 above. In addition, examine an area of at least one pipe diameter of the main feedwater line downstream at the auxiliary feedwater to main feedwater connection.

Action Performed:

During the 1985 first Unit 2 refueling outage, UT examinations of feedwater pipe weld areas at the containment penetration, and auxiliary feedwater piping welds at containment were conducted as part of the Unit 2 ISI program in accordance with the ASME B&PV Code, Section XI as described in FSAR Section 6.6. Results of these examinations have been provided by letter dated July 16, 1985, from Mr. H. E. Morgan to Mr. J. B. Martin. The additional examinations described in Bulletin Item 2.a. and required by Reference (2) were, however, not performed during the first Unit 2 refueling outage. However, all Action Item No. 2.a inspections have been performed at Unit 3 during the recently completed refueling outage, and the results are that no cracking or unacceptable code discontinuities were found. Note that access for inspection of two (2) welds on each feedwater line is partially blocked by large pipe whip restraints. All accessible segments of these partially blocked welds have been UT inspected to the extent possible. The other 5 welds per line were fully UT inspected.

Because Unit 3 is identical to Unit 2, and because Bulletin Action Item No. 1 inspections were conducted on both Unit 2 and Unit 3, these Unit 3 first refueling outage inspections are hereby substituted for Unit 2 first refueling outage inspections to complete the required actions as soon as possible. Note that the bases for the primary use of UT with RT as a supplement if required instead of primarily using RT with UT as a supplement if required as requested in the bulletin are provided on page 3 of Enclosure (1).

Bulletin Item 2.b.:

Action Required:

For steam generator designs utilizing auxiliary feedwater systems connected by means of welded nozzle connections, perform volumetric examination of all auxiliary feedwater nozzle to piping welds and the first adjacent outboard pipe-to-pipe welds (risers) in accordance with Item 1 above.

For designs utilizing auxiliary feedwater systems connected to the steam generator by means of bolted flange connections, perform volumetric examination of the flanged nozzle to piping and first outboard pipe-to-pipe welds (risers) in accordance with Item 1 above.

The examinations specified in Item 2.b. above are not required provided that during startup, hot standby or cold shutdown operations, the feedwater level within the steam generator is maintained essentially constant and no intermittent cold auxiliary feedwater injection is utilized; i.e., auxiliary feedwater injection, where used, is preheated during the forementioned operating modes.

Action Performed:

As previously described in Reference (3), Bulletin Item 2.b. is not applicable to San Onofre Unit 2.

Bulletin Item 2.c.:

Action Required:

Perform a visual inspection of all feedwater system piping supports and snubbers in containment to verify operability and conformance to design.

Action Performed:

As required by the Bulletin and Reference (2) all feedwater system snubbers in containment at Unit 2 were visually inspected during the first refueling outage to verify operability in accordance with Technical Specification Surveillance Requirements. All snubbers were found to be operable. The additional examination of all feedwater system pipe supports, as described in Bulletin Item 2.c. and required by Reference (2), was, however, not performed during the Unit 2 refueling outage. These additional Bulletin Item 2.c. inspections of feedwater system piping supports and snubbers inside containment have been performed at Unit 3 during the recently completed first refueling outage which verified operability and conformance to design, and are hereby substituted for Unit 2 inspections to complete the required actions as soon as possible.

Bulletin Item No. 3: Shutdown and Inspection of Similar Units

Action Required:

Identification of cracking indications in feedwater nozzle or piping weld areas in one unit of a multi-unit facility shall require shutdown and inspection of other similar units which have not been inspected since May 1979, unless justification for continued operation is provided.

Action Performed:

Since feedwater nozzle and piping weld areas in both Units 2 and 3 have been inspected after conducting hot functional testing since May 1979, and no cracking or unacceptable code discontinuities were found, Bulletin Item 3 is not applicable.

Bulletin Item No. 4: 24 Hour Report

Action Required:

Any cracking or other unacceptable code discontinuities identified shall be reported to the Director of the appropriate NRC Regional Office within 24 hours of identification.

Action Performed:

As stated above, no cracking or code discontinuities were identified during the Bulletin Item 1.a or 2.a inspections.

Bulletin Item No. 5: Written Report

Bulletin Item 5.a.:

Action Required:

Provide a written report to the Director of the appropriate NRC Regional Office within 20 days of the date of Revision 1 to Bulletin No. 79-13 (August 30, 1979) addressing your schedule for inspection if required by Item No. 1.

Action Performed:

The inspection schedule was initially provided in Reference (3). Bulletin Item Nos. 1 and 2 were completed as described above in the Bulletin Item Nos. 1 and 2 discussions.

Bulletin Item 5.b:

Action Required:

Provide a written report to the Director of the appropriate NRC Regional Office within 20 days of the date of Revision 1 to Bulletin No. 79-13 (August 30, 1979) addressing the adequacy of your operating and emergency procedures to recognize and respond to a feedwater line break accident.

Action Performed:

In Reference (3) SCE committed to develop procedures which would adequately address and provide for a response to a feedwater line break. The San Onofre operating and emergency procedures which are now implemented to adequately address recognition of and response to a feedwater line break accident are the following:

- S023-12-6 Loss of Feedwater
- S023-2-1 Main Feedwater Pump and Turbine Operation
- S023-9-6 Feedwater Regulating System Operation

Bulletin Item 5.c.:

Action Required:

Provide a written report to the Director of the appropriate NRC Regional Office within 20 days of the date of Revision 1 to Bulletin No. 79-13 (August 30, 1979) addressing the methods and sensitivity of detection of feedwater leaks in containment.

Action Performed:

Response previously provided in Reference (3).

Bulletin Item No. 6: Written Reports of Examinations

Action Required:

A written report of the results of examination, in accordance with requests by Regional Offices preceding this Bulletin and with Bulletin Item Nos. 1 and 2 including any corrective measures taken, shall be submitted within 30 days of the date of Revision 1 to Bulletin No. 79-13 (August 30, 1979) or within 30 days of completion of the examination, whichever is later, to the Director of the appropriate NRC Regional Office with a copy to the NRC Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, D.C. 20555.

Action Performed:

A written report of the results of Bulletin Item No. 1.a. inspections for Unit 2 was reviewed by Region V and accepted in Section 3 of Region V Inspection Report 50-361/81-14 dated August 14, 1981. The results of completed examinations in response to Bulletin Item 2.a (weld examinations) and Item 2.c (pipe support and snubber inspections) are described above in the Bulletin 2.a and 2.c discussions. Because of the time that has elapsed since this IE Bulletin 79-13 was issued and since the pre-fuel load examinations were performed in response to this bulletin, because the Unit 2 pre-fuel load inspection report has already been reviewed and approved by Region V, and because of the number of inspections that have been conducted on both Units 2 and 3 both prior to fuel load and during the first refueling outages, the series of reports which document these inspections is not being submitted, but is currently available for review by the NRC, Region V at the San Onofre site.

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