

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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S1-20P-4211-1

December 31, 1992

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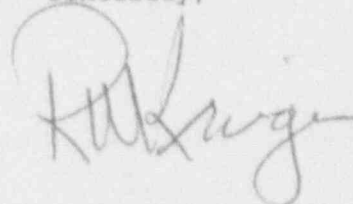
Docket Nos. 50-206, 50-361, and 50-362
Supplemental Report
Licensee Event Report No. 90-018, Revision 1
San Onofre Nuclear Generating Station, Units 1, 2, & 3

Reference: Letter, H. E. Morgan (SCE) to USNRC Document Control Desk, dated
October 22, 1990.

The referenced letter provided an abstract of the Event Report (LER) No. 90-018, (Docket No. 50-206, Revision 0), for a condition involving noncompliance with inservice testing technical specification requirements at Unit 1. The enclosed supplemental LER provides additional information concerning the event, causes, corrective actions, and safety significance. Since this occurrence now involves similar systems, causes, and corrective actions applicable to Unit 1 as well as Units 2 and 3, a single report for Unit 1 is being submitted in accordance with NUREG-1022. Neither the health nor the safety of plant personnel or the public was affected by this condition.

If you require any additional information, please so advise.

Sincerely,



Enclosure: LER No. 90-018, Rev. 1

cc: C. W. Caldwell (USNRC Senior Resident Inspector, Units 1, 2 and 3)
J. B. Martin (Regional Administrator, USNRC Region V)
Institute of Nuclear Power Operations (INPO)
J. O. Bradfute, NRC Project Manager, San Onofre Unit 1
M. B. Fields, NRC Project Manager, San Onofre Units 2 and 3

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| LICENSEE EVENT REPORT (LER) | | | | | | | | | | | | | | |
|--|--------|-----------|--|------------------------|---------------------|--------|----------------------|-------------------|------------------------|---|---|-------|----------------------|------|
| Facility Name (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 1 | | | | | | | | | | Docket Number (2) 0 5 0 0 0 2 0 6 | | | Page (3) 1 of 0 8 | |
| Title (4) VALVES NOT INSERVICE TESTED IN ACCORDANCE WITH TECHNICAL SPECIFICATION | | | | | | | | | | | | | | |
| EVENT DATE (5) | | | LER NUMBER (6) | | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | | | |
| Month | Day | Year | Year | /// Sequential Number | /// Revision Number | Month | Day | Year | Facility Names | | Docket Number(s) | | | |
| 1 | 0 | 2 | 0 | 0 | 1 | 1 | 2 | 3 | SONGS, UNIT 2 | | 0 5 0 0 0 3 6 1 | | | |
| 1 | 0 | 2 | 0 | 0 | 1 | 1 | 2 | 3 | SONGS, UNIT 3 | | 0 5 0 0 0 3 6 2 | | | |
| OPERATING MODE (9) 6 | | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11) | | | | | | | | | | | |
| POWER LEVEL (10) 0 0 0 | | | 20.402(b) | | 20.405(c) | | 50.73(a)(2)(iv) | | 73.71(b) | | Other (Specify in Abstract below and in text) | | | |
| | | | 20.405(a)(1)(i) | | 50.36(c)(1) | | 50.73(a)(2)(v) | | 73.71(c) | | | | | |
| | | | 20.405(a)(1)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(vi) | | | | | | | |
| | | | 20.405(a)(1)(iii) | | X 50.73(a)(2)(i) | | 50.73(a)(2)(vii)(A) | | | | | | | |
| | | | 20.405(a)(1)(iv) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(viii)(B) | | | | | | | |
| | | | 20.405(a)(1)(v) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | | | | | | | |
| LICENSEE CONTACT FOR THIS LER (12) | | | | | | | | | | | | | | |
| Name R. W. Krieger, Station Manager | | | | | | | | | | TELEPHONE NUMBER AREA CODE 7 1 4 3 6 8 - 6 2 5 5 | | | | |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFAC- TURER | REPORTABLE TO NPRDS | CAUSE | SYSTEM | COMPONENT | MANUFAC- TURER | REPORTABLE TO NPRDS | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | Expected Submission Date (15) | | Month | Day | Year |
| Yes (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | | | | | | | | | | | | | | |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16) | | | | | | | | | | | | | | |

On September 20 and 25, 1990, nonconformance evaluations were completed which concluded that testing for 10 main steam ASME code class valves had not been performed per the Unit 1 Technical Specification (TS) 4.7 Inservice Testing (IST) requirements. This was initially reported in Revision 0 to this LER on October 22, 1990.

Nonconformance evaluations that were under review when LER 90-018, Revision 0 was issued later concluded that a total of 47 valves (including the 10 previously described) had not been tested as required by ASME, Section XI. Some of these are Unit 2 and 3 valves as well as additional Unit 1 valves not previously reported. As such, the Units 2 and 3 TS 4.0.5 IST requirements were also not fully implemented.

The failure to incorporate certain valves into the SONGS IST program was a result of an incorrect initial program scope as well as a failure to correctly update the program to reflect changing regulatory requirements, licensing commitments, and design enhancements. Various corrective actions have and are being implemented in order to ensure that the IST program scope is complete. Among the completed corrective actions have been extensive efforts to validate the scope of the SONGS Unit 2 and 3 IST program. With the permanent shutdown of Unit 1 on November 30, 1992, no further actions are planned for Unit 1.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATION STATION | DOCKET NUMBER | LER NUMBER | PAGE |
|---------------------------------------|---------------|------------|--------|
| UNIT 1 | 05000206 | 90-018-01 | 2 of 8 |

Plant: San Onofre Nuclear Generating Station
 Units: One, Two, and Three
 Reactor Vendor: Westinghouse and Combustion Engineering
 Event Date: 09-20-90

A. CONDITIONS AT TIME OF THE EVENT:

Unit 1 - Mode 6, Refueling/Core Off-Loaded
 Units 2 and 3 - Mode 1, Power Operation at 100%

B. BACKGROUND INFORMATION:

This LER addresses weaknesses in the San Onofre Nuclear Generating Station (SONGS) inservice testing (IST) program which were initially identified and reported in an abstract LER on October 22, 1990. This revision provides the cause, corrective actions, and safety significance for the discrepancies identified in the earlier abstract LER and additional discrepancies which were subsequently discovered.

Inservice Testing Program (IST):

San Onofre Unit 1 Technical Specification (TS) 4.7, "Inservice Inspection Requirements," and Units 2 and 3 TS 4.0.5 require that inservice inspection and testing of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50, Section 50.55a(g). Performance of this testing, via the IST program, is intended to assess the operational readiness of certain safety related pumps [P] and valves [V].

C. DESCRIPTION OF THE EVENT:

1. Event:

On September 20 and 25, 1990, nonconformance evaluations were completed which concluded that testing for 10 main steam valves had not been performed per the Unit 1 TS 4.7 IST requirements since they were not specifically exercised and stroke tested as required by ASME, Section XI. This was initially reported on October 22, 1990.

Nonconformance evaluations that were being reviewed when LER 90-018, Revision 0 was issued later concluded that a total of 47 valves (including the 10 previously described) had not been tested as required by ASME, Section XI. These valves had either; 1) not been incorporated into the IST program, or 2) were included in the IST program but the program did not test all of the valve(s) safety functions. Some of these additional valves are Unit 2 and 3 valves as well as additional Unit 1 valves not previously reported. As such, the Unit 2 and 3 TS 4.0.5 IST requirements were also not fully implemented.

2. Inoperable Structures, Systems or Components that Contributed to the Event:

None.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATION STATION | DOCKET NUMBER | LER NUMBER | PAGE |
|---------------------------------------|---------------|------------|--------|
| UNIT 1 | 05000206 | 90-018-01 | 3 of 8 |

3. Sequence of Events:

Not applicable.

4. Method of Discovery:

The deficiencies in the IST program were discovered as a result of the following:

- o The Unit 1 1990 Single Failure Analysis (SFA) review (Refer to LER 90-016, Rev. 1, dated April 30, 1991, Docket No. 50-206).
- o Review of testing requirements for certain Unit 1 main steam branch line isolation valves [ISV] located upstream of the turbine stop valves [SHV], by a plant engineer (utility, non-licensed).
- o Development of SCE's response to NRC Bulletin 89-02, "Stress Corrosion Cracking of High-Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350W Swing Check Valves or Valves of Similar Design," for Units 1, 2, and 3.

5. Personnel Actions and Analysis of Actions:

Not applicable.

6. Safety System Responses:

Not applicable.

D. CAUSE OF THE EVENT:

The failure to incorporate certain valves into the SONGS IST program was a result of an incorrect initial program scope as well as a failure to correctly update the program to reflect changing regulatory requirements, licensing commitments, and design enhancements. This was attributed to:

1. Not fully understanding the design requirement(s) and function(s) for each valve, e.g.,

- o Unlike Units 2 and 3, the Unit 1 P&IDs did not reflect code class boundaries. Thus, no complete and accurate boundary classification document existed for the Unit 1 ASME equivalent components and piping. Consequently, the correct ASME Code classification was not assigned in some cases.
- o Certain valves either had one or more safety functions which had not been identified and tested as required.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATION STATION | DOCKET NUMBER | LER NUMBER | PAGE |
|---------------------------------------|---------------|------------|--------|
| UNIT 1 | 05000206 | 90-018-01 | 4 of 8 |

2. Not fully understanding the Code requirements. The requirement to test all safety functions of individual valves was not completely understood. In some cases valves had safety functions to both open and close, though only one of the functions was tested.
3. Not having adequate administrative controls to ensure that plant design or safety analysis changes were evaluated for impacts to the IST program, and that subsequent IST program changes were incorporated into the appropriate implementing procedure(s), e.g.,
 - o The IST program did not previously require confirmation from the affected department that program change information had been either received or incorporated into the appropriate implementing procedure(s).
 - o The previous design change process controls did not provide any specific direction to flag valves for specific IST program incorporation review. Code Class valves that serve a safety function were identified as having been added to the plant design, but the design change package did not require a review for ASME Section XI testing requirements. As a result, these valves were not added to the IST program.

E. CORRECTIVE ACTIONS TAKEN:

1. For the valves discussed above: 1) the required testing has been identified, 2) the IST program was updated, and 3) the valves have been tested as required.
2. The design change control process has been revised to ensure that the impact of a change on the IST program is properly assessed and incorporated into the program as appropriate.
3. The IST program procedures have been revised to ensure that the required IST program changes are identified and the required actions are completed appropriately and in a timely manner.
4. As indicated below in Section G.3, an IST program revalidation effort has been completed. The goal of this undertaking was to assess and revalidate the scope of the SONGS IST programs for all three units using currently applicable regulatory guidance and definitions.
5. SCE has also completed an extensive review of Unit 2 and 3 safety-related valves against the guidance provided in Generic Letter 89-04 (refer to Section G.4). Implementation of appropriate IST program modifications resulting from this review remains to be completed.
6. An IST Topical Design Bases Document (DBD) which includes a verification of the scope and acceptance criteria of the existing IST program, and addresses IST licensing and programmatic requirements has been developed.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATION STATION | DOCKET NUMBER | LER NUMBER | PAGE |
|---------------------------------------|---------------|------------|--------|
| UNIT 1 | 05000206 | 90-018-01 | 5 of 8 |

7. An ongoing program is underway to develop design bases documentation for each of the Unit 2 and 3 systems. This program will validate the IST database to add design basis parameters and values (Ref. R. M. Rosenblum (SCE) letter to Mr. Stuart Richards, U.S. Nuclear Regulatory Commission, Region V, dated July 31, 1992).
8. With the November 30, 1992, permanent shutdown of Unit 1, no further actions are planned for Unit 1.

F. SAFETY SIGNIFICANCE OF THE EVENT:

All but four of the 47 reportable valves satisfactorily passed their specified tests when first tested per the revised IST program. For this group of valves, there was no safety significance since the acceptable test results indicate that they would have performed their safety function if required.

For those valves which failed their initial IST, a separate safety significance discussion is presented below.

Unit 1 Main Condenser Steam Dump Valves

On January 14, 1991, one of two main condenser steam dump valves (S1-MSS-CV-4) [VTV] did not fully stroke closed while being tested per the ASME, Section XI IST requirements. This valve is a Category B valve required to be periodically stroked closed and tested to fail closed.

S1-MSS-CV-4 is a normally closed valve which acts as a steam dump valve to the main condenser, and fails in the closed direction to satisfy the intent of General Design Criteria 57 to provide containment isolation. When the valve is operated in the quick open mode, the valve, once open, may fail to close. If this were to occur, containment isolation would be accomplished per procedure by utilizing a manual isolation valve (S1-MSS-395).

A review of the applicable main steam line break (MSLB) and steam generator tube rupture (SGTR) Updated Final Safety Analysis Report (UFSAR) analyzed events indicate that the overcooling and radiological effects of a stuck open condenser steam dump valve (e.g., S1-MSS-CV-4) are bounded by the applicable UFSAR accident analyses and assumptions. Therefore, there was no safety significance due to S1-MSS-CV-4 failing to fully close during its initial IST.

Unit 1 Pressurizer Spray Valves

On January 16, 1991, both pressurizer spray valves [PCV] S1-PZR-PCV-430C (from reactor coolant (RCS) loop B cold leg) and S1-PZR-PCV-430H (from RCS loop A cold leg) failed their IST stroke closed test. Both valves failed to close as required, PCV-430C would not move and PCV-430H was slow to close. During normal operations, these valves modulate to control pressurizer pressure. Their safety function is to close for hot leg recirculation (HLR) and function as a system boundary. HLR flow mitigates the buildup of boric acid in the reactor vessel during long term cooling following a postulated RCS cold leg break (LOCA) by

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATION STATION | DOCKET NUMBER | LER NUMBER | PAGE |
|---------------------------------------|---------------|------------|--------|
| UNIT 1 | 05000206 | 90-018-01 | 6 of 8 |

providing a flow path from the containment sump through the core from top to bottom, and then out the cold leg break.

As discussed in SCE Engineering Specification M-41383, "Emergency Core Cooling Systems Single Failure Analysis," failure of either spray valve in the open position would result in a full or partial diversion of the HLR primary flow path to the RCS loop A or loop B cold legs. The inherent compensation for this failure is the use of the alternate HLR path per Emergency Operating Instruction (EOI) SOI-1.0-23, "Transfer to Recirculation." The alternate HLR path is independent of the primary HLR path and supplies HLR flow to the RCS loop C hot leg.

Both the primary and alternate HLR paths are described in UFSAR Section 6.3.2.1.2. The effects of recirculation operation on the core is described in UFSAR Section 6.3.3.4. In the unlikely event both normal methods of HLR failed, the operators could have used steam generator reflux condensation as an alternate means to prevent boron precipitation in the core. EOIs have historically instructed the operator in the use of this cooling mechanism. Thus, the potential for the spray valves to fail to close and cause the subsequent loss of the primary HLR flow path is not considered to be safety significant.

Unit 2/3 Service Water Supply to Salt Water Pump Check Valves

The salt water cooling (SWC) system [BS] pump seals [SEALS] and bearings are normally cooled and lubricated by the non-safety-related service water system [KG]. In the event that the service water system becomes inoperable due to maintenance or in the unlikely event of a Design Basis Earthquake (DBE), the SWC system is equipped with an emergency recirculation water supply to cool and lubricate the pump seals and bearings. This emergency cooling circuit is a closed loop supplied from the respective SWC pump discharge back to the service water supply inlet. A service water supply check valve [V] is located in its respective SWC pump service water supply line just upstream from where this emergency cooling water recirculation line ties in. This check valve prevents the loss of emergency cooling water supply by closing on flow reversal. Its malfunction could create the possibility of an inadequate supply of emergency cooling water to the SWC pump seals and bearings leaving the SWC pump(s) incapable of performing their safety function.

On August 14, 1991, prior to the initial IST, the Unit 3 service water supply check valve S31413MU050 for SWC pump 3MP114 was found to be blocked with corrosion products and missing internal pieces (lock washer and cap screw). These are Contromatics 1" spring-loaded-ball-check valves which do not have seat leakage requirements. In this condition, and without having previously been tested, it could not be determined if the check valve would have been capable of closing during a postulated DBE event requiring emergency seal water recirculation flow.

It has been determined through analysis and testing that under postulated accident conditions (i.e., an upstream pipe break and a stuck open check valve S31413MU050), the SWC pump can be expected to perform satisfactorily for long-term operation. The quantity of emergency seal water flow to the bearing system would be sufficient to keep the bearings cool and to prevent the intrusion of abrasive particles even with the postulated flow diversion through the failed valve and out

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATION STATION | DOCKET NUMBER | LER NUMBER | PAGE |
|---------------------------------------|---------------|------------|--------|
| UNIT 1 | 05000206 | 90-018-01 | 7 of 8 |

the ruptured pipe. Therefore, there would not have been any safety significance if check valve S31413MU050 had failed to fully close.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

Not applicable.

2. Previous LERs for Similar Events (all Docket No. 50-206):

LER 89-013: It was discovered that the Unit 1 IST program for valves did not include an open response time requirement for the two RCS Power Operated Relief Valves contrary to TS 4.7.

LER 90-004: A nonconformance review identified that the IST program incorrectly categorized the letdown orifice isolation valves CV-202, 203, and 204 as Category B valves when the valves should have been Category A valves. Thus the required seat leakage verification testing was not performed.

LER 90-009: A review of safety-related check valves required per NRC Bulletin No. 89-02, "Stress Corrosion Cracking of High-Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350W Swing Check Valves or Valves of Similar Design," identified six check valves in the secondary Chemical Feed System that had not been tested per TS Section 4.7 requirements.

None of the above LERs' corrective actions would have prevented this event since the valve testing deficiencies were identified, in part, during implementation of the corrective actions described in the above LERs.

3. 1990 IST Program Revalidation:

The IST programs, as currently applied to Units 1, 2 and 3, evolved over a period of years. The guidance for the program scope, which is not contained in a single source or document, has likewise evolved during this time. When the original programs were developed, the documentation and basis for IST applicability was not rigorous, making it difficult to re-create the initial rationale for inclusion/exclusion of plant components in the program. Additionally, numerous design changes potentially affecting the IST program had been implemented on the plants since the IST programs were originally written without having undergone an adequate IST applicability review. For these reasons, early in 1990 a re-assessment and revalidation of the content of the IST programs for the three units was determined to be necessary. The IST program reviews were completed on December 20, 1990, and Units 1, 2 and 3 IST program updates have been implemented based on the review findings.

As part of the 1990 revalidation, all safety-related valves were reviewed for inclusion in the program. ASME, Section XI was the primary document used for this review. Although Generic Letter 89-04, "Guidance on

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| SAN ONOFRE NUCLEAR GENERATIO | TION | DOCKET NUMBER | LER NUMBER | PAGE |
|------------------------------|------|---------------|------------|--------|
| UNIT 1 | | 05000206 | 90-018-01 | 8 of 8 |

Developing Acceptable Inservice Testing Programs," was used in parallel with the Code to determine whether or not a valve should be included in the program, its guidance was not thoroughly incorporated into the 1990 review.

4. 1992 Units 2 and 3 Generic Letter 89-04 Evaluation:

In early 1992, prior to an NRC Region V check valve inspection performed in April and May, SCE initiated a limited review of the IST program for Units 2 and 3. As a result of this review, SCE identified on April 24, 1992, that the Auxiliary Feedwater pump discharge valves had not been subjected to testing in the closed direction as identified in Generic Letter 89-04. This finding led to the review of the testing requirements for other safety-related check valves. By April 29, 1992, a number of other check valves, including a number of Emergency Core Cooling System valves, were identified to have not been tested in the closed direction. Based on these internal findings, SCE decided to perform a rigorous independent review of the Units 2 and 3 IST program against the requirements in Generic Letter 89-04 (Ref. Letters: R. M. Rosenblum (SCE) to the NRC, dated June 22, 1992, and W. C. Marsh (SCE) to the NRC, dated October 30, 1992).