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October 26, 1989

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: Docket Nos. 50-206, 50-361 and 50-362
Reply to a Notice of Violation and Notice of Deviation
San Onofre Nuclear Generating Station, Units 1, 2 and 3

- References:
- a. Letter, Mr. J. B Martin (NRC) to Mr. Harold B. Ray (SCE), dated August 29, 1989
 - b. Letter, F. R. Nandy (SCE) to R. P. Zimmerman (NRC), dated September 20, 1989

Reference (a) forwarded NRC Inspection Report Nos. 50-206/89-16, 50-361/89-16 and 50-362/89-16 and a Notice of Violation and Notice of Deviation resulting from the maintenance team inspection conducted by Mr. A. Toth and other members of the NRC staff during the period of June 26 through July 21, 1989. In accordance with 10 CFR 2.201, Enclosure I to this letter provides the Southern California Edison (SCE) reply to the subject Notice of Violation and Notice of Deviation. As discussed in reference (b), this submittal was delayed in order to provide a complete response.

Mr. Martin's letter also requested that SCE provide a plan of action to resolve the NRC's findings related to equipment status control. Enclosure II to this letter provides the requested information.

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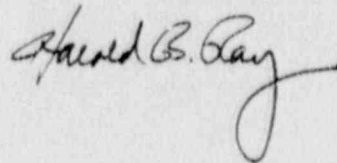
As discussed in the inspection report, SCE shares the NRC's concern with the apparent lack of worker attention to detail in the development of maintenance work plans, in the implementation of maintenance work instructions, and in root cause analyses and development of comprehensive corrective action plans. The lack of worker attention to detail is currently the focus of management attention. SCE is developing, through various programs, worker awareness and commitment to eliminating such deficiencies.

One such program has been implemented in Operations and has demonstrated effectiveness in improving Operator attention to detail. In this program, Work Authorization Requests (WARs), Operations surveillances and procedures/instructions, and Technical Specification Action Statement tracking documents are audited by the Operations Audit Group to identify deficiencies and omissions. Since the program became fully implemented in January 1988, the error rate average has been reduced 40%, from 372 per 100,000 to 222 per 100,000 data points - a 99.78% accuracy rate (a "data point" is any required fill-in information such as data, initials, dates/times, etc.). SCE believes this reflects the overall improvement in worker attention to detail at San Onofre. Nevertheless, further effort is necessary and we are committed to continuing improvement in this area.

SCE anticipates additional programs and training may be required, and will institute innovations, changes and modifications, as specific actions are identified.

If you require any additional information, please so advise.

Very truly yours,



89-059G

Enclosures: As stated

cc: J. B. Martin, Regional Administrator, NRC Region V
C. W. Caldwell, NRC Senior Resident Inspector, San Onofre
Units 1, 2 and 3

ENCLOSURE I

REPLY TO A NOTICE OF VIOLATION
AND NOTICE OF DEVIATION

VIOLATION 1

Appendix A to Mr. J. B. Martin's letter, dated August 29, 1989, states in part:

- "1. San Onofre Nuclear Generating Station (SONGS) Unit 1 Technical Specification 6.8.1 states, in part, that 'Written procedures shall be established, implemented and maintained covering...surveillance and test activities of safety related equipment.'

"San Onofre approved plant procedures and SO123-II-9.37 established the post-maintenance testing and return to service requirements applicable to safety related air operated valves. These procedures required calibration of the valves and recording of associated data on 'Instrument Calibration Data Card(s)'. The procedures were invoked by the 'Tests Required' section of maintenance order MO# 87102901000, for the safety related Unit 1 containment spray header isolation valve actuator S1-CRS-CV-82-ACT.

"Contrary to the above, on February 25, 1988, Unit 1 personnel failed to perform the specified calibration and testing as required by maintenance order MO 87102901.

"This is a Severity Level IV Violation (Supplement I) applicable to Unit 1."

RESPONSE TO VIOLATION 1

1. Reasons For The Violation

SCE admits that on February 25, 1988, calibration and testing data was not recorded on calibration cards as required by the maintenance order. However, all required calibration and testing was correctly performed.

Prior to 1988, SCE performed the subject calibrations using Unit 1 Instrument and Control (I&C) Technicians. Units 2 and 3 performed the subject calibrations using Unit 2/3 Boiler and Condenser (B&C) Mechanics (note: the Unit 1 I&C and B&C groups are separate from the Unit 2/3 I&C and B&C groups). In 1988, Unit 1 Maintenance Supervision elected to assign the Unit 1 B&C Mechanics responsibility for these calibrations.

Due to personnel error, Maintenance Supervision failed to ensure that:

- (1) the Unit 1 B&C Mechanics were adequately trained on the record keeping requirements prior to performing the calibrations. Although some undocumented, informal training had been provided to the Unit 1 B&C Mechanics, the training was neither adequate nor appropriate; and
- (2) adequate field supervision was provided during initial performance of the calibrations.

SCE has concluded that this was an isolated oversight because this is the only failure relating to a change in job scope.

Due to personnel error, personnel assigned to review and approve the calibrations, in accordance with procedure SO123-II-9.37, failed to identify that all documentation requirements had not been satisfied. The failure to adequately review the completed work is indicative of worker inattention to detail.

2. Corrective Steps That Have Been Taken And The Results Achieved

On October 15, 1989, Maintenance management provided instructions to appropriate Unit 1 Maintenance supervisory personnel, emphasizing the importance of their role in: (1) assuring craft workers are fully trained and qualified to perform tasks; (2) closely supervising new and/or first-time activities; and (3) assuring that personnel reviewing completed calibrations correctly complete all documentation requirements.

3. Corrective Steps That Will Be Taken To Avoid Further Violations

In addition, formal classroom and laboratory training will be conducted by the Nuclear Training Division of appropriate Unit 1 B&C Mechanics for the required documentation requirements for calibration of control valves. This training will be completed by March 31, 1990.

4. Date When Full Compliance Will Be Achieved

Full compliance will be achieved at the next outage of sufficient duration when the next surveillance will be performed. At that time, the calibration cards will be correctly completed, reviewed and approved.

VIOLATION 2

Appendix A to Mr. J. B. Martin's letter, dated August 29, 1989, states in part:

- "2. San Onofre Nuclear Generating Station (SONGS) Unit 2 Technical Specification 6.8.1 states, in part, that 'Written procedures shall be established, implemented and maintained covering...the applicable procedures recommended in Appendix 'A' of Regulatory Guide 1.33, Revision 2, February 1978.' Appendix A of Regulatory Guide 1.33, Section 1.c specifies administrative procedures for 'Equipment Control (e.g., locking and tagging)'.

"Implementing SONGS procedures SO123-0-21 (TCN 1-4, dated May 25, 1989) and SO123-XV-10.0 (Revision 0, November 14, 1985) had been established for 'Equipment Status Control'. These safety related procedures were not implemented for the Unit 2 containment spray pump #1 Work Authorization Request (WAR) 2-8902448, as follows:

- "a. Procedure SO123-0-21 states, in part, '6.5.1 A licensed operator or qualified person will prepare the WAR in accordance with applicable portions of WAR keypoints (Attachment 2)...'

"Contrary to the above, on May 15, 1989, WAR 2-8902448 was not prepared and updated/maintained fully in accordance with the applicable portions of the WAR keypoints, as follows:

- #34 WAR 2-8902448 did not specify a 'tailboard' briefing.
- #36 The date of release was not recorded for one of four releases.
- #37 'When' (more work required) was not recorded.
- #47 No record of date/time the tagout was completed.
- #48 The important-to-safety control room handswitch was not verified for the containment spray pump-1 motor control. Unused spaces were not crossed through with diagonal lines to prevent unauthorized add-ons.

"b. Procedure SO123-0-21 states, in part, '6.18.6 People that are working under the Work Authorization shall be notified prior to release of the Work Authorization by the Work Authorization holder.'

'6.20.2 All Work Authorization holders affected by any tagging status changes shall notify all personnel working under their work authorization of the change.'

"Contrary to the above, on May 30, 1989, personnel working under WAR 2-8902448 were not notified prior to the release of this WAR.

"c. Procedure SO123-XV-10.0, states, in part, '6.2.3 Foreman (or above) shall: .1 Review the SO(123) 1356 to ensure all entries are complete and job(s) is complete;...'

"Contrary to the above, on May 30, 1989, on WAR 2-8902448, a foreman (or above) did not review the associated SO(123) 1356 prior to release of the equipment for use (testing).

"This is a Severity Level IV Violation (Supplement I) applicable to Unit 2."

RESPONSE TO VIOLATION 2

1. Reasons For The Violation

With regard to Item 2.a, SCE admits that the subject Work Authorization Record (WAR) was not completed in accordance with procedure SO123-0-21, "Equipment Status Control". The failure to fill out all the WAR keypoints resulted from Operators' lack of attention to detail in failing to follow the procedure in completely filling out the WAR form.

With regard to Item 2.b and c., SCE admits that on May 30, 1989, all personnel working under WAR 2-8902448 were not notified prior to the release of the WAR and the foreman did not review the associated SO(123) 1356 form prior to releasing equipment for testing. These failures occurred because the General Foreman failed to follow the cited procedures, as follows:

On May 29, 1989, a Work Authorization Modification (WAM) was prepared for Master WAR 2-8902448 to allow testing of a pump. The WAM process should have resulted in the review of the WAR, physically obtaining the appropriate clearance tag(s), and notification of appropriate personnel that the WAR clearance was being temporarily removed.

The General Foreman assumed responsibility for processing the WAM. He obtained the applicable clearance tag. However, the General Foreman failed to follow the procedural requirements to review the 1356 form and notify, or ensure that notification would be made to, the other work groups signed on the WAR.

SCE has provided as Enclosure II to this response, a discussion of SCE's actions relating to the Work Authorization program.

2. Corrective Steps That Have Been Taken And The Results Achieved

With regard to Item 2.a, the requirement to properly complete steps and associated signoffs/initials of procedures/forms continues to be stressed as part of the Operations Division "professional Operators Development and Evaluation Program". In order to evaluate the performance of Operators in this area, the Operations Audits Group audits 100% of all WARs, Operations surveillances and procedures/instructions, and Technical Specification Action Statement tracking documents to identify deficiencies and omissions. The audit results have been used, not only in direct feedback to the affected Operators, but also as a performance measure for recognition awards. Although deficiencies and omissions have not yet been completely eliminated, the error rate average has been reduced since the program was fully implemented in January 1989.

With regard to Items 2.b and c, the following actions were taken:

Upon discovery that all work groups on the WAR had not been properly notified of the WAM, the proper clearance on the containment spray pump was promptly re-established.

Appropriate disciplinary action was administered to the General Foreman.

Appropriate Maintenance personnel have been informed of this event, and provided guidance on the importance of procedural compliance, through briefings held by the Maintenance Manager.

3. Corrective Steps That Will Be Taken To Avoid Further Violations

With regard to Item 2.a, retraining will be provided to appropriate licensed Operators and equipment control evaluators on the Work Authorization process, including the importance of completing all required WAR form entries. This retraining will be completed by December 31, 1989, and continued training will be included in the Licensed Operator Regualification program.

With regard to Items 2.b and c, additional corrective actions are described in Enclosure II.

4. Date When Full Compliance Will Be Achieved

Full compliance was achieved on May 30, 1989, when the proper clearance on the containment spray pump was re-established.

VIOLATION 3

Appendix A to Mr. J. B. Martin's letter, dated August 29, 1989, states in part:

- "3. 10 CFR 50, Appendix B, Criteria 16 requires, in part, 'In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition... and the corrective action shall be documented and reported to appropriate levels of management.'

"Contrary to the above, San Onofre Unit-1 Nonconformance Report NCR S01-P-7294, dated June 28, 1989, did not establish the cause of identified inadequate thread engagement on fasteners on the Unit-1 east safety injection pump.

"This is a Severity Level IV Violation (Supplement I) applicable to Unit 1."

RESPONSE TO VIOLATION 3

1. Reasons For The Violation

SCE admits that Nonconformance Report (NCR) S01-P-7294, dated June 28, 1989, did not include a formal root cause analysis for the identified thread engagement condition of the fasteners on the Unit 1 east safety injection pump.

In June 1987, a support plate was added behind the existing bracket on the east safety injection pump. As a result of the increased thickness of the support plate, when the Maintenance worker reinstalled the nut on the bolt, the available bolting exposed for thread engagement was reduced. The Maintenance worker apparently did not realize that the "one thread of the stud or bolt should extend above the nut" requirement specified in the SCE Torque Manual was not satisfied, and he did not initiate an NCR.

In late 1988, SCE initiated a "required reading" for Maintenance personnel on the contents of the SCE Torque Manual. SCE believes that subsequent to this training, such situations would result in Maintenance worker(s) recognizing a condition which does not meet the Torque Manual requirements and them issuing an NCR.

When the NRC identified the subject condition (apparent incomplete bolt to nut thread engagement), NCR S01-P-7294 was issued on June 28, 1989. SCE procedure S0123-XV-5.0, "Nonconformance Report System", steps 6.8 and 6.11.1, requires that Block 26, "Apparent Cause", shall be completed as determined by Station Technical's evaluation of whether there is a need for a formal root cause analysis. Formal root cause analyses are performed in accordance with reference 2.5.2, "Guidelines for Root Cause Evaluation".

When deciding whether to require a root cause analysis, engineering personnel exercised judgement in determining that a formal root cause analysis was not appropriate in this instance. Their decision was based upon the belief that the observed thread to nut engagement had been reviewed by the design engineer and QA at the time of installation and had been accepted. As a result, Block 26 of NCR S01-P-7294 only stated that the "apparent cause" of the condition was because a "support plate was added to (the) flange under (the) lower two bolts..."

In summary, SCE has concluded that the reason a root cause analysis was not performed, was the judgement of the engineers that the NCR procedure did not require one in this case.

2. Corrective Steps That Have Been Taken And The Results Achieved

In August 1989, a review of the Guidelines for Root Cause Evaluation was initiated in order to incorporate the guidelines into permanent station procedures by November 30, 1989. The procedural revision under development will provide better guidance on when a formal root cause analysis is required and how to document that determination.

3. Corrective Steps That Will Be Taken To Avoid Further Violations

As a result of previous concerns relating to thread engagement, SCE performed a walkdown of Units 2 and 3 to identify and correct instances of inadequate thread engagement. Identified deficiencies were evaluated and repaired or reworked, as appropriate. A thread engagement walkdown for Unit 1 will be completed by January 31, 1990.

4. Date When Full Compliance Will Be Achieved

Full compliance was achieved on July 12, 1989, when NCR SO1-P-7294 was dispositioned.

DEVIATION 1

Appendix B to Mr. J. B. Martin's letter, dated August 29, 1989, states in part:

- "1. The San Onofre Unit-1 Updated Final Safety Analysis Report, Section 9.5.3, states that "... 8 hour emergency lighting system typically provides the following minimum average illumination levels:

"Control Room	10	foot-candles
Safe shutdown equipment rooms	3	foot-candles
Access and egress routes	0.5 - 1.0	foot-candles

"Contrary to the above, during July 12, 1989 walkdown of areas of Unit 1 under simulated loss of all AC power conditions, the following emergency lighting levels were identified.

- "a. The illumination level at the entrance to the Unit 1 #1 Diesel Generator Room measured 0.0 foot-candles.

- "b. The illumination level at the entrance to the Unit 1 #2 Diesel Generator Room measured 0.0 foot-candles.
- "c. The illumination level at the remote shutdown panel transfer switch measured 0.1 foot-candles.
- "d. The illumination levels at Unit 1 Lower Radwaste Building charging pump breaker No. A.451.2 (Panel B-31) measured 0.1 to 0.3 foot-candles."

RESPONSE TO DEVIATION 1

1. Reasons For The Deviation

SCE admits that for the locations listed above, the illumination levels were less than the illumination criteria currently listed in UFSAR Section 9.5.3.

When the subject emergency lighting units were installed and tested, they were not tested using the UFSAR illumination criteria. SCE's Design Criteria Manual criteria, with regard to emergency lighting, is that illumination be sufficient for the Operators to perform their tasks (i.e., a qualitative criteria), this is not consistent with the quantitative requirements stated in the UFSAR.

SCE's Design Criteria Manual criteria was developed because our experience showed that a light meter could not be reliably used to measure low illumination values. Our experience has shown that low illumination measurements are not always reliable or reproducible due to limitations in testing methodology, such as the variances in readings in one location as the light meter is re-oriented (i.e., facing up, down, right, left, etc.) and the wide variances in readings possible due to isolated bright spots and shadows in a path.

The discrepancy between the Design Criteria Manual and the UFSAR was not identified. When performing the acceptance test, personnel utilized the Design Criteria Manual criteria (qualitative) to determine whether sufficient lighting existed.

SCE will process a UFSAR change to adequately reflect methodology which is consistent with the Illuminating Engineers Society (IES) Handbook. The IES Handbook specifies specific objective design criteria for access/egress routes (0.5 foot-candles), acceptable variance ratios (40 to 1) and recognizes the difficulty in applying measurement criteria. SCE's assessment has concluded that additional lighting units will be required to meet this criteria.

2. Corrective Steps That Have Been Taken And The Results Achieved

As an interim corrective action, flashlights are readily available to Operators.

3. Corrective Steps That Will Be Taken To Avoid Further Deviations

Appropriate emergency lighting units will be installed by April 30, 1990.

SCE will prepare an appropriate UFSAR change to delineate both illumination levels and testing methodology, which will be based upon the Illuminating Engineer Society Handbook.

4. Date When Corrective Actions Will Be Completed

Corrective actions will be completed by April 30, 1990, when appropriate emergency lighting units are installed.

DEVIATION 2

Appendix B to Mr. J. B. Martin's letter, dated August 29, 1989, states in part:

"2. The San Onofre Units-2/3 Updated Final Safety Analysis Report, Section 15.6.3.3.5, Radiological Consequences, states that:

'... Leakage from the HPSI, LPSI, and CSS pump seal leakoff connections upstream of the pump throttle bushings is piped to the associated ESF pump room floor drain and is subsequently directed to the ESF building sump... '

"Contrary to the above, during July 20 inspection, Unit-3 LPSI pumps 3P-015 and 3P-016 were not equipped with piped leakoff lines and the leakage drained directly to the floor under the pump."

RESPONSE TO DEVIATION 2

1. Reasons For The Deviation

SCE admits that the Unit 3 LPSI pumps 3P-015 and 3P-016 were not equipped with piped leakoff lines that drained directly to the ESF floor drain under the pump, contrary to the description in the FSAR.

SCE's root cause determination into this condition (Nonconforming Report [NCR] No. 3-2456) could not be completed because installation of the leakoff line occurred prior to 1980 during initial construction. Consequently, SCE has not been able to determine the root cause of why conformance with the FSAR description was not systematically verified.

As discussed in separate correspondence (Letter, Mr. Kenneth P. Baskin to Mr. J. B. Martin, dated October 3, 1988), SCE has previously recognized (and reported to the NRC) that in the past, SCE's control of engineering and technical work had not been fully successful. SCE has concluded that the identified deviation is another instance of those deficiencies.

Notwithstanding that the LPSI seal leakoff line is not hard-piped to the floor drain, SCE's preliminary investigation concluded that any resultant releases via this pathway are bounded by the FSAR accident analyses. SCE's final conclusions will be discussed further in Licensee Event Report No. 89-008, Revision 1 (Docket No. 50-362).

2. Corrective Steps That Have Been Taken And The Results Achieved

SCE is preparing Field Change Notices (FCN) packages to provide the requisite LPSI seal leakoff line piping. The plant modification is will be completed by December 31, 1989.

3. Corrective Steps That Will Be Taken To Avoid Further Deviations

As discussed in the referenced October 3, 1988 letter from Mr. Kenneth P. Baskin (SCE) to Mr. J. B. Martin (NRC), SCE has initiated a Design Basis Documentation program to comprehensively identify the design bases of safety related systems and topical areas. Design requirements from the FSAR are specifically included in this program. The program includes a verification phase, which is currently under development.

SCE anticipates that this verification phase will be based on a sampling approach, to select those design requirements which require verification. The sampling will be biased towards those design requirements which have not been previously verified through other means, such as start-up or surveillance testing.

4. Date When Corrective Actions Will Be Completed

Corrective actions will be completed by December 31, 1989, when the LPSI seal leakoff piping is restored to the design configuration.

ENCLOSURE II

REQUEST FOR ADDITIONAL INFORMATION

Mr. J. B. Martin's letter, dated August 29, 1989, states in part:

"The findings related to equipment status control are particularly troublesome. The inability to resolve the long-standing problems in this area reflects poorly on your management system. Please address your plan of action to resolve this situation in your response to this letter."

RESPONSE

SCE acknowledges that equipment status control has been a continuing problem at San Onofre. As discussed in the NRC inspection report, SCE has already taken many actions to resolve the identified deficiencies on a case-by-case basis. These actions have not been fully effective in establishing the level of control necessary because:

- (1) Work Authorization procedures did not establish effective control over work activities;
- (2) Maintenance and Operations personnel training was not effective in ensuring adequate understanding of the Work Authorization process or in communicating management's expectations for the level of attention to detail;
- (3) Work Authorization forms were confusing, difficult to use, and did not include adequate "human factors"; and
- (4) Work Authorization system tagouts were not automated, resulting in manual preparation errors and non-uniformity in tagout preparation.

Since the NRC inspection, SCE has initiated or completed a number of improvements to the Work Authorization process. The changes involved both the Maintenance and Operations Divisions, as follows:

- (3) Retraining of appropriate licensed Operators and equipment control evaluators on the new Work Authorization process will be completed by December 31, 1989. Subsequent continuing training will be included in the Licensed Operator Regualification program.

Summary

The program enhancements discussed above, coupled with those changes previously implemented (discussed in the NRC inspection report), are expected to improve the equipment status control program. As personnel are trained and gain experience in the use of the new procedures, additional improvements will be instituted, as appropriate, to further enhance the Work Authorization process.

Maintenance

- (1) On September 5, 1989, SCE issued two new Maintenance procedures: (1) SO123-I-1.2, "Work Authorization Process"; and (2) SO123-I-1.2.1, "Master Work Authorizations". These procedures allow WARs and Master WARs to be handled more concisely and effectively, and formalize the position of "Work Authorization Coordinator" within Maintenance.

New forms included as a part of procedure SO123-I-1.2.1 are: "Master Work Authorization Subissue Sheet"; "Master Work Authorization Subissue Status Sheet"; and "Work Authorization Modification in Process". These forms provide greater accuracy and detail than the previous single form.

- (2) Concurrent with the issuance of these procedures, training was initiated for maintenance personnel who were to be authorized WAR holders (in order to be a current authorized WAR holder, training certification is required). Completion of this training for all appropriate personnel is scheduled for December 31, 1989.

Appropriate Maintenance supervisors received training on the new procedures, and have been sensitized to the problems with WARs, and the events associated with Violation 2, through meetings led by the Maintenance Manager.

Operations

- (1) As a result of a review of SO123-0-21, "Equipment Status Control", a revised WAR form has been developed and is currently being reviewed to eliminate redundant information and to improve its useability. The revised WAR form will be issued by December 31, 1989.
- (2) Development is continuing on the computerized Standard Tagouts program as part of the SONGS Integrated Scheduling System effort. When validated, these Standard Tagouts will help ensure consistency and reduce errors in manual tagout preparation. This development effort is a combined effort between the Operations, Maintenance, and NIS Divisions, and includes a pre-review of newly developed tagouts and a "post-mortem" of Standard Tagouts that have been used on-shift to determine the need for any change, both in the Tagout itself and/or in the process.