

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-206/85-13, 50-361/85-12, 50-362/85-11

Docket Nos. 50-206, 50-361, 50-362

License Nos. DPR-13, NPF-10, NPF-15

Licensee: Southern California Edison Company
P. O. Box 800
2244 Walnut Grove Avenue
Rosemead, California 91770

Facility Name: San Onofre Units 1, 2 and 3

Inspection at: San Clemente, California

Inspection conducted: March 4-8, 1985 and April 1-5, 15-19, 1985

Inspector:	<u>PD Narbut</u>	<u>5/31/85</u>
	P. P. Narbut, Project Inspector	Date Signed
	<u>Dennis J. Willett</u>	<u>5-31-85</u>
	D. J. Willett, Reactor Inspector	Date Signed
Approved By:	<u>P. H. Johnson</u>	<u>6/6/85</u>
	P. H. Johnson, Chief	Date Signed
	Reactor Projects Section No. 3	

Summary:

Inspection during period of March 4-8 and April 1-5, 15-19, 1985 (Report Nos. 50-206/85-13, 50-361/85-12 and 50-362/85-11)

Areas Inspected: Unannounced inspection by regional inspectors of unresolved and followup items, and licensee actions on IE Bulletins and TMI Action Items. The inspection involved 86 inspection hours by two inspectors.

Results: One violation was identified regarding an unauthorized design change (paragraph 4).

DETAILS

1. Individuals Contacted

a. Southern California Edison Company (SCE)

- *J. G. Haynes, Station Manager
- *R. W. Kreiger, Deputy Station Manager
- *D. B. Schone, Site QA Manager
- *P. A. Croy, Manager, Compliance
- *D. E. Brown, Supervisor, Maintenance Codes and Welding
- *R. F. Penn, Station Codes Engineer
- *D. Sheridan, Supervisor Plant Maintenance, Unit 1
- *H. Newton, Manager Maintenance Engineering
- *T. A. Mackey, Supervisor Compliance
- *C. A. Kergis, Compliance Engineer
- F. Briggs, NSSS, Mechanical Supervisor
- *J. Reilly, Technical Manager
- M. Wharton, Supervising Engineer, NSSS Support
- J. Boardman, ISI Engineer
- W. Savage, General Foreman, Maintenance Planning
- *W. M. Lazear, QA Supervisor
- V. Gow, Lead QA Engineer, Codes
- L. Rice, Supervisor, Site Supply

* Denotes those personnel in attendance at the exit interview on April 19, 1985.

2. Licensee Actions on Bulletins and Previously Identified Inspection Items

a. (Closed) IE Bulletin 79-27, Loss of Non-Class 1E Instrumentation and Control Power System Bus During Power Operation, Unit 1

Background

The bulletin required licensees to review power supplies to safety and non safety related instrumentation and control systems which could affect the ability to achieve cold shutdown, to describe any resulting design modifications and to prepare emergency procedures for such an event. The licensee's actions for this bulletin were examined in Inspection Reports 50-206/80-16, 80-19, 80-28 and 80-31. The remaining action was to verify that the licensee had prepared emergency procedures for the loss of the 125v DC busses prior to the Unit 1 return to power in 1981. Unit 1 returned to power on June 17, 1981.

This Inspection

The inspector examined the current emergency procedure for the loss of the 125v DC buses. The current procedure is Abnormal Operating Instruction S01-2.6-4, Revision 0, dated November 17, 1983. The procedure contains information, as required by the bulletin, to

enable the operator to recognize the symptoms of a loss of the buses and describes the required operator actions. The inspector verified that the procedure had in fact been issued prior to the 1981 return to power. The procedure at that time was S01-1.7-3, issued May 4, 1981, and contained the same information which was reorganized and later issued as the superseding (and current) procedure S01-2.6-4.

Based on the licensee's actions this bulletin is considered closed.

b. (Open) IE Bulletin 80-06, Engineered Safety Features (ESF) Reset Controls

The licensee actions regarding the subject bulletin were examined in report 50-206/81-29. All aspects were closed except valves MOV-1100B, C and D which did not respond properly after the ESF signal was reset. The licensee had established administrative (procedural) controls for an interim control measure. A letter from SCE to NRC dated February 27, 1984 defined the commitment to rework the control circuitry for the valves during the Cycle 9 refueling in 1986.

This item remains open pending licensee action on valves MOV 1100-B,C, and D.

c. (Closed) IE Bulletin 82-02, Degradation of Threaded Fasteners

Background

The bulletin addressed corrosion and cracking of reactor coolant pressure boundary fasteners and imposed inspection requirements beyond those already addressed in inservice inspection (ISI) requirements. The licensee's actions and responses to the bulletin were addressed in inspection report 50-206/84-11 which closed certain items. The remaining licensee action was to inspect specified fasteners when otherwise removed for maintenance or repair and report the results to the NRC.

The licensee had requested certain exemptions from the Bulletin requirements as follows:

- ° Results of fastener inspections will be included in ISI inspection reports available for NRC review at the site, rather than reported separately to the NRC as required by the bulletin (reference SCE to NRC letter dated April 3, 1985).
- ° Nondestruction examinations will only be done if a fastener is to be reused and if it has significant degradation, otherwise only a visual inspection will be performed, unless an evaluation of the visual examination otherwise dictates (reference SCE letter dated April 3, 1985).

This Inspection

The inspector examined the procedures in place to perform the bulletin required inspections. The procedures applicable are:

- ° S0123 XVII-1.0, Revision 0, dated October 3, 1984, "Inservice Inspection Program Implementation"
- ° S0123-I-7.19, Revision 9, dated August 24, 1983, "Monitoring of Threaded Fasteners (Bolts/Studs) in the Reactor Coolant Pressure Boundary (RCPB)"

The procedures were found to adequately define the bulletin required actions for fastener inspection.

The inspector examined the licensee's inspection data for bolting from the following components.

- ° Pressurizer Relief Valve bolts for valves 533 RV, 532 RV
- ° Steam Generator manway bolts for steam generators A, B and C, hot and cold leg sides
- ° RHR valves MOV 833, MOV 813, MOV 814

The bolt inspection results were satisfactory for the pressurizer code safety valves and the steam generator manways. The inspector verified that data were recorded and actions were taken in accordance with procedure requirements.

The results for the RHR valves were unsatisfactory. The licensee had performed a walkdown for corrosion as part of the return to service effort for Unit 1. That walkdown identified corroded fasteners on the RHR valves. The bulletin's fastener inspection requirements were properly invoked by the licensee maintenance personnel in conjunction with their decision to replace the fasteners.

As will be discussed separately in paragraph 4 of this report, the selection of replacement fastener material was not proper; a lower strength material was used without proper engineering review and approval.

In regards to bulletin actions however, the fastener inspection data for the corroded RHR valves also appeared to be improperly taken. Specifically, the maintenance orders required inspection of the fasteners (in accordance with the procedure) by visual examination and then a surface examination by NDE. This was required "even though existing fasteners may be replaced with new fasteners." The purpose of the bulletin was to examine corroded fasteners for evidence of stress corrosion cracking by performing surface examinations.

The procedural step signoffs by the maintenance mechanics (on the maintenance work orders) were marked "N/A" in the steps for decontamination of the bolts, examination of the bolts, and forwarding of the results to engineering for evaluation. The steps were annotated that the step was N/A'd because the bolts could not be decontaminated and were too corroded for inspection. The inspector considered that, technically, the rationale for not performing the inspection was poor. The licensee has facilities for performing inspections of contaminated items. Additionally, the corroded condition of the bolts made them good examples of the kinds of conditions the bulletin inspections were directed towards, rather than a reason not to perform an inspection.

The maintenance orders involved were:

- ° MO 306819 for MOV 813
- ° MO 307501 for MOV 814
- ° MO 84042175001 and MO 307503 for MOV 833

The completed maintenance order (with the inappropriately N/A'd steps) was reviewed and approved by the procedurally required organizations which should have flagged the inappropriate decision. These organizations included QA and Engineering. The inspector considered the issuance of a Notice of Violation for this matter but concluded a violation was not involved for the following reasons:

- ° Lack of Safety Significance: The failure to inspect bolts did not meet procedure requirements at the time, but do meet current requirements (reinspect for reuse only). Secondly, there has not been a history of stress corrosion cracking of this material. The bolts were examined by the licensee (as a catch-up-effort during this inspection) and none had stress corrosion cracking problems.
- ° Previous Licensee Actions: As a result of other violations the licensee had since taken aggressive actions regarding the "N/A" of procedural steps. These actions were not in place at the time of the bolt inspections in 1984.

Conclusion:

Based on the licensee's actions and the revised requirements reflected in the licensee's April 3, 1985 letter to the NRC which reduce the data gathering and reporting requirements, this bulletin is considered closed.

d. (Closed) IE Bulletin 83-06, Nonconforming Materials Supplied by Tube-Line Corporation

Background:

The licensee's actions for this bulletin were previously examined in inspection reports 50-206/84-23 and 84-30. At that time the inspector had found additional installed Tubeline material which had

not been identified by the licensee's search. The remaining actions were for the licensee to submit a revised response to the bulletin, to include actions to prevent recurrence of an incomplete search and to ensure previous actions taken regarding generic communications (on material problems) were properly investigated and evaluated.

This Inspection

The inspector reviewed the licensee's revised response to the bulletin. The revised response was dated December 4, 1984. The licensee identified the reason for the initial incomplete search as having failed to review the material provided through Bechtel field purchase orders. This search was a general one (for material searches) during the period of September 1980 through September 1984, when no Bechtel field organization was in place at SONGS 1 to review field purchases. During this time the Bechtel search mode was limited to home office purchase reviews. It should also be noted that the specified scope of the bulletin was ASME piping, and the Tubeline fittings found at San Onofre 1 were in systems not constructed to the ASME Code.

To prevent the recurrence of incomplete searches, the licensee has initiated significant action in the form of a program called COPE (Control of Problem Equipment) which is planned to be totally in place by June 1985. The program was generated in response to the inspector's findings regarding this bulletin and Bulletin 84-02 (paragraph 2.e) regarding HFA relays. The completion of the COPE program will be examined as part of the followup of that Bulletin.

Additionally, SCE instructed Bechtel to perform a reinvestigation of material searches conducted during the period that a Bechtel field procurement group was not in place. SCE audited those Bechtel remedial actions and found them satisfactory. Additionally, Bechtel identified, in a letter dated January 11, 1985 (McClusky to Nunn), how they would revise and proceduralize future material searches to ensure completeness.

Subject to the followup of the licensee's new COPE program to be followed up as part of Bulletin 84-02, this bulletin (83-06) is considered closed.

e. (Open) IE Bulletin 84-02, Failure of GE HFA Relays

Background:

The licensee actions for this bulletin were examined and described in inspection reports 50-206/84-30 and 84-33. The inspector had determined that the licensee's material search had not been comprehensive; the inspector discovered the subject relays in the warehouse. The remaining items regarding the licensee's actions were verification of the COPE program (Control of Problem Equipment), and verification of the procurement Quality Assurance surveillances of the adequacy of licensee actions for previous

material searches conducted for IE Bulletins and Information Notices.

This Inspection

The inspector reviewed site order S0123-CP-1, Revision 0, dated February 27, 1985, which outlined the program to be established and defined responsibilities.

The inspector met with responsible personnel and reviewed the schedule, which shows full implementation by June 1985.

This bulletin remains open pending implementation of the COPE program and review of the procurement QA verification actions.

3. Licensee Actions on Previously Identified Inspection Items

- a. (Open) Followup Item 50-206/80-11-03, No cold-to-hot relief pressure correlation factor for the Pressurizer Code Safety Valves setpoint testing

Background:

The inspector had previously observed in the 1980 inspection that the licensee performed required periodic set pressure tests of the Unit 1 Pressurizer Code Safety valves in a cold condition. Cold testing of safety valves is a generally acceptable method of verifying set pressure provided that the expected difference in the pressure at which the valve actuates (in the hot versus cold condition) is known and accounted for.

This requirement, for a cold-to-hot correlation factor, is derived from the Technical Specification requirement to perform periodic relief pressure tests of the subject valves in accordance with the requirements of ASME Section XI. The ASME Section XI requirements, in turn, reference ASME PTC 25.3 for the performance of safety and relief valve testing. The introduction of PTC 25.3, Section 0, cautions that "...if the temperature of the medium used to test the valve differs substantially from the temperature to which the valve is subjected while in service, the opening and closing pressures...will be different from the test pressure...it is necessary to develop appropriate corrections for the valve under test to account for these differences."

The open status of this item was discussed at a regional inspector's exit interview on December 21, 1984.

This Inspection

The inspector reviewed the current versions of the maintenance and test procedures applicable to the pressurizer code safety valves (PRV 532 and 533) and confirmed the licensee had not yet included a cold-to-hot correction factor in their set point test procedure.

The current set point test procedure is S01-1-2.3, Revision 2, dated October 14, 1984. The valve is tested cold with a nitrogen medium.

The inspector met with the responsible site engineering manager and his technical staff to discuss the item. The staff presented information which demonstrated that the issue of proper testing of safety and relief valves is an industry wide subject of interest. There have been several initiatives by various organizations aimed at resolving the issue. Two notable efforts are (1) an NRC requirement (imposed in the technical specifications) for newer plants to test safety valves hot and with the same medium as seen in service and (2) an ASME code committee (OM-1) effort to revise the code requirements to require essentially the same thing but provide some options. The licensee had gathered some data, from TVA and EPRI, but the data showed significant scatter. The data do not apply directly to the Unit 1 Crosby valves but are consistent in that the hot tested set point is always lower than the cold tested setpoint (the conservative direction).

The inspector requested the licensee to provide rationale to demonstrate that the change in set point (from cold-to-hot) for the Unit 1 safety valves would be in the conservative direction and to affirm that no safety analyses would be adversely affected by the expected change in set point. The licensee presented general industry information which demonstrated that safety valves have a hot set point from 1 to 180 psi lower than the cold set point. The fact that San Onofre does not have a history of inadvertent relief valve lifts indicates that the change in set point for a hot valve is not an operational problem at normal operating pressures. The licensee also presented a memorandum dated April 16, 1985 from the Westinghouse site representative to Station Technical, SCE. The memorandum states:

- ° Westinghouse has no directly applicable data for the Unit 1 valves but the same type of conservative change can be expected.
- ° There is no unresolved safety concern with a cold-to-hot set point drift (in the lower set point direction).

At the exit interview the inspector discussed the findings regarding this item, specifically that no apparent action toward resolution had occurred since the item was identified in 1980 and that the information provided indicated there was not an unresolved safety question involved. The inspector requested the licensee to identify the path to resolution of this item. Licensee management stated that the resolution of this item would be addressed in the context of a larger initiative, that being the licensee's plans for a general revision and reformatting of their technical specifications to be accomplished in conjunction with their SEP actions.

Specifically, the licensee plans to update the FSAR (and technical specifications) after the completion of the SEP evaluation (scheduled for 1985) in accordance with 10 CFR 50.71(e)(3)(ii).

This item remains open pending further licensee action.

4. Maintenance Issues

During the examination of IE Bulletin 82-02 regarding degradation of fasteners, the inspector examined certain aspects of the licensee's controls for maintenance and maintenance testing. These aspects included compliance with ASME Section XI repair and testing requirements, material control, engineering involvement in design changes, records accuracy, procedure adequacy, torquing requirements, proper test pressure, and supplier material certifications. Specifically, these aspects were reviewed as they related to the replacement of corroded carbon steel fasteners with stainless steel fasteners on RHR valves MOV 833, 813 and 814. All aspects examined were found satisfactory with the following exceptions:

Improper Design Change

The maintenance orders issued to replace corroded body to bonnet studs on the RHR valves replaced the original carbon steel fasteners with lower strength stainless steel fasteners. There were two central problems identified by the inspector:

- ° No design analysis was performed to assure the lower strength material was adequate for service.
- ° Licensee personnel failed to recognize the material substitution as a design change.

The specific details involved are as follows:

The valves involved are RHR MOV-813, 814 and 833. The valves are reactor coolant pressure boundary components. Valve 813 is the first isolation valve in the reactor coolant system loop C outlet to the RHR system; and therefore sees RCS pressure in service.

The associated documentation for the valves is:

<u>Valve</u>	<u>Maintenance Work Order</u>	<u>ASME Section XI Abstract</u>	<u>MERS*</u>
MOV 813	306819	S01-011-83	010-83
814	307501	S01-009-83	007-83
833	307503	S01-010-83	008-83 Rev. 1

* Maintenance Engineering Repair Specification

The original construction design code was ANSI B31.1, 1964 Edition, but repair and replacement are to be done to ASME Section XI, 1977 Edition. The manufacturer was Crane Valve Company, drawing DR 33473 (for 6" valve 833) and drawing DR 33463 (for 8" valves 813 and 814).

The original bolting material specified by Crane was ASTM A-193 Grade B7 Chrome-Moly Carbon steel (which has a minimum tensile strength of approximately 125 ksi). The replacement material installed by SCE was

ASTM A 193 Grade B8 Chromium Nickel Stainless steel (which has a minimum tensile strength of approximately 75 ksi).

The responsible station engineering manager stated a design reconciliation analysis had not been performed to verify that the material substitution was technically adequate. During the inspection, preliminary analysis was performed in response to the inspector's findings and the preliminary results showed that the new material was satisfactory for service, that design margins have possibly been reduced, but that there was no cause for an immediate safety concern. The responsible engineering manager so stated during the exit interview on April 19, 1985.

The Code of Federal Regulations, 10 CFR 50, Appendix B, Criterion III, state in part that:

"Design changes including field changes shall be subject to design control measures commensurate with those applied to the original design."

The licensee's design control measures for repair and replacement activities are specified in the SCE Topical Quality Assurance Manual, Appendix IV "ASME Code Section XI Repair and Replacement Program" which states in part "Repairs and replacements performed at Unit 1 will implement the requirements of ASME Code Section XI, 1977 Edition through Summer 1978 Addenda...."

ASME Section XI, IWB 7600 states in part "Materials shall comply with the requirements to which the original component or part was constructed." IWA 7210 allows for replacement material provided: "Modified or altered designs are reconciled with the Owner's Specification through the Stress Analysis report, Design Report or other suitable method which demonstrates satisfactory use for the specified design and operating conditions...."

Contrary to the above, carbon steel body to bonnet studs were replaced with significantly weaker stainless steel studs on RHR valves MOV 813, 814, and 833 without a design reconciliation by a suitable method which demonstrated satisfactory use for the specified conditions.

This is an apparent violation. (Violation 50-206/85-13-01)

The inspector also noted a similar carbon to stainless bolt material substitution was authorized in 1981 for pipe flange bolting. Flange bolting generally sees a lesser loading than body to bonnet valve bolting and is generally very conservative in design strength. There was no evidence at the time of inspection that the material substitution authorized was, in fact, implemented. Therefore no violation was identified. The material substitution was authorized by a change to the "Piping Design and Material Specification" Number M-18668 Sh 179 Revision 0, Configuration Change Notice 1 dated January 19, 1981.

At the exit interview the licensee representatives committed to determine if the material substitution authorization was implemented and to verify

that the substitution authorization is a technically sound design change. (Followup item 50-206/85-13-02)

Improper Test Pressure

RHR Valve MOV 813 is a boundary gate valve between the RCS and RHR systems. As such, in normal operation it is shut and sees RCS normal operating pressure rather than the much lower normal operating pressure of the RHR system on its "high pressure" side and in the valve bonnet area. Upon replacement of studs the ASME Code requires a leakage test at "not less than the normal operating pressure associated with 100% rated reactor power".

The studs in questions see RCS system pressure in service but were leak tested at the lower RHR system pressure.

This matter is primarily one of test data record validity since the studs did eventually see RCS system pressure and normal planned QC walkdowns would have identified any leakage problems. At the exit interview, the licensee committed to examine methods to improve the detailed specification of test requirements for system boundary valves. (Followup Item 50-206/85-13-03.)

5. TMI (NUREG 0737) Activities (Unit 2)

The inspector reviewed the licensee's program for/and implementation of NUREG 0737 items I.C.1, I.D.2, and II.F.2: Accident and emergency procedure implementation, safety parameter display system, and instrumentation for detection of inadequate core cooling, respectively.

a. I.D.2 (Open) Safety Parameters Display System (SPDS)

The accident monitoring system includes the Critical Factors Monitoring System and the Safety Parameters Display System. A sub-set to this is the Q-SPDS (SPDS for seismically qualified parameters). The licensee's implementation of the requirements in I.D.2 was as follows:

- ° The operability requirements of the SPDS (required by NUREG-0696) are included within the technical specification requirements for the Accident Monitoring System instrumentation. The SPDS is installed and complete except for that which is supplied by the heated junction thermocouples (HJT). The licensee stated that the design change package which incorporates the HJT's will be complete when the head is installed, the instruments are connected to the SPDS and the cables are rung-out, tested, and calibrated. This work is scheduled to be completed just prior to restart after the first refueling outage.
- ° The inspector observed the use of the SPDS system by license candidates in the control room, and verified their training and understanding of the system. Closure of this item will be verified at a later inspection when the HJT work is complete.

b. II.F.2 (open) Instrumentation for Detection of Inadequate Core Cooling

Generic Letter No. 83-37 identifies those TMI items for which technical specifications are required. Enclosure 1, item 10, provides guidance for II.F.2. Enclosure 3 provides model technical specifications. The Subcooling Margin Monitor (SMM), the Heated Junction Thermocouple System and the Core Exit Thermocouples (CET's) comprise the instrumentation for detection of inadequate core cooling. The licensee's implementation of the requirements of II.F.2 was as follows:

- ° San Onofre-2 technical specifications (amendment 31) address some item II.F.2 instruments in numbers 11, 18 of the accident monitoring instrumentation tables for limiting conditions of operation and surveillance requirements. On January 11, 1985, the C.E. Owners Group submitted (after discussions of fundamental disagreement) to NRR proposed HJT System Technical Specifications. The licensee has submitted a Technical Specification proposal (consistent with the C.E. Owners Group proposal) to NRR for consideration.
- ° Procedure implementation and training for prompt recognition of inadequate core cooling using existing instrumentation (per NUREG-0578) was observed during license examinations on the plant simulator. Procedures used by operators to recognize inadequate core cooling, which rely on data from the SMM, HJT, and CET's (per NUREG-0694) will be evaluated when TMI item I.C.1 is reviewed.

This item will be closed out after:

- (1) Completion of the HJT system work
- (2) When NRR has reviewed and amended the technical specifications
- (3) When a review of selected emergency procedures which use SMM, HJT, CETs, and the SPD System is completed during a follow-up inspection of TMI item I.C.1.

c. TMI Item I.C.1 (open) Accident and Emergency Procedure Implementation

This TMI item requires licensees to:

- ° Perform analyses of transients and accidents (including small break LOCA's and inadequate core cooling), and prepare emergency procedures (symptom based) for multiple and consequential failures.
- ° Revise procedures to address inadequate core cooling, transients and accidents (per NUREG-0694 and NUREG-0578), maintaining consistency with the Final Long-Term guidance contained in NUREG-899 (implementing document for the emergency procedures pilot program--TMI item I.C.8).

The inspector verified the existence, use and training of personnel, in symptom based single/multiple and consequential transient and accident procedures, during testing of license candidates on the plant simulator.

Procedures which address inadequate core cooling will be reviewed during a follow-up inspection when the HJT System and QSPD System are complete and the technical specifications which address them are approved by NRR.

6. Exit Interview

The inspector met with the licensee personnel denoted in paragraph 1 on April 19, 1985. The inspection details and findings as noted in this report were discussed.