U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos.	50-206/88-13, 50-361/88-11, 50-362/88-11
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 92770
Facility Name:	San Onofre Units 1, 2 and 3
Inspection at:	San Onofre, San Clemente, California
Inspection conducted:	April 10, 1988 through May 21, 1988

Inspectors:

P H Johnson for F. R. Huey, Senior Resident Inspector, Units 1, 2 and 3 — 6/22/88 Date Signed

P H Johnson for J. E. Tatum, Resident Inspector — 6/22/88 Date Signed

P H Johnson for A. L. Hon, Resident Inspector — 6/22/88 Date Signed

Approved By:

P H Johnson
P. H. Johnson, Chief
Reactor Projects Section 3 — 6/22/88 Date Signed

Inspection Summary

Inspection on April 10, 1988 through May 21, 1988 (Report Nos. 50-206/88-13, 50-361/88-11, 50-362/88-11)

Areas Inspected: Routine resident inspection of Units 1, 2 and 3 Operations Program including the following areas: operational safety verification, evaluation of plant trips and events, monthly surveillance activities, monthly maintenance activities, refueling activities, independent inspection, licensee event reports review, and followup of previously identified items.

Inspection procedures 30703, 37701, 40700, 60710, 61726, 62703, 71707, 71709, 71710, 71881, 90712, 92700, 92701 were covered.

Results:

General Conclusions and Specific Findings:

1. The inspectors noted several examples that indicated a need for improved operator awareness and attention to detail (Paragraph 2.a and 2.b).

2. The inspectors noted programmatic weaknesses in the conduct of hydrostatic testing (Paragraph 4.a).

3. The inspectors noted an example of poor work practice (Paragraph 5.d).

4. The inspectors noted a weakness in controlling the status of containment penetrations (Paragraph 7).

Significant Safety Matters:

The inspectors identified that refrigerant levels were not being monitored routinely and appropriate acceptance criteria had not been established to ensure operability of the Emergency Chillers (Paragraph 2.b).

Summary of Violations: None.

Open Items Summary:

During this report period, 1 new unresolved and 7 new follow-up items were opened. A total of 12 follow-up items were closed and 1 was examined and left open.

DETAILS

1. Persons Contacted

Southern California Edison Company

*C. McCarthy, Vice President, Site Manager
*H. Morgan, Station Manager
D. Heinicke, Deputy Station Manager
D. Schone, Quality Assurance Manager
D. Stonecipher, Quality Control Manager
*R. Krieger, Operations Manager
*D. Shull, Maintenance Manager
J. Reilly, Technical Manager
P. Knapp, Health Physics Manager
D. Peacor, Emergency Preparedness Manager
P. Eller, Security Manager
J. Reeder, Operations Superintendent, Unit 1
*V. Fisher, Operations Superintendent, Units 2/3
*L. Cash, Maintenance Manager, Unit 1
*R. Santosuosso, Maintenance Manager, Units 2/3
*M. Wharton, Assistant Technical Manager
*C. Couser, Compliance Engineer

*Denotes those attending the exit meeting on May 13, 1988.

The inspectors also contacted other licensee employees during the course of the inspection, including operations shift superintendents, control room supervisors, control room operators, QA and QC engineers, compliance engineers, maintenance craftsmen, and health physics engineers and technicians.

2. Operational Safety Verification (71707)
Radiological Protection (71709)
Security (71881)

The inspectors performed several plant tours and verified the operability of selected emergency systems, reviewed the Tag Out log and verified proper return to service of affected components. Particular attention was given to housekeeping, examination for potential fire hazards, fluid leaks, excessive vibration, and verification that maintenance requests had been initiated for equipment in need of maintenance. The inspectors also observed selected activities by licensee radiological protection and security personnel to confirm proper implementation of and conformance with facility policies and procedures in these areas.

a. Operator Awareness (Unit 2)

(1) While reviewing the Unit 2 Control Operator's logs (during cold shutdown), the inspector noted that core protection calculator channel C had come out of bypass with steam generator 1 and 2

low flow bistables in the tripped condition (reset of the bypass is designed to occur automatically if reactor power exceeds 1E-4 percent). The log entry, dated March 31, 1988, indicated that the bistables were returned to the bypassed condition by the operator. The inspector discussed this condition with the Unit Superintendent, and observed that action had not been initiated to identify the cause of this anomaly. This item is open pending licensee action (50-361/88-11-01).

(2) During the Unit 2 reactor startup that was conducted on April 4, 1988, the inspector observed that loop 2 hot leg injection pressure indicator 2PI-9422 was reading approximately 2500 psi. Anything greater than 1000 psi was considered abnormal and could be indicative of excessive leakage from loop 2 hot leg injection check valve S21204MU156. The Shift Superintendent stated that the hot leg injection header had been previously depressurized and it took approximately 20 minutes for the header to repressurize. This indicated that if check valve back-leakage was occurring, it was less than the 1 gpm allowed by the Technical Specifications. The Shift Superintendent further stated that the source of leakage into the hot leg injection header was suspected to be the charging header because reactor coolant system pressure was nominally 2250 psia. This was subsequently determined to be the case, and the source of leakage was eliminated by more tightly seating two manual isolation valves. Although the inspector noted that excessive check valve leakage did not exist, the following observations were made:

- Evaluation of this condition by Operations was informal and a log entry was not made.
- The condition was not being monitored periodically to assure continued operability of hot leg injection check valve S21204MU156.

The inspector discussed these observations with the Operations Manager. This item is closed (50-361/88-11-02).

(3) While maintenance was being conducted on Unit 2 diesel generator 2G003 (Train B), the inspector observed that the governor oil levels associated with the Unit 2 Train A diesel engines (2G-002 engines #1 and #2) were slightly below the sight glass level specified for standby operation. The Shift Superintendent stated that the Train A diesel generator set was operated prior to taking the Train B diesel generator set out for maintenance, and the oil levels may have dropped slightly as a result of running the engines. Shortly after corrective action was taken to restore the oil levels in the governors, the inspector observed that the governor oil level associated with Train A diesel engine #2 exceeded the specified oil level for standby operation. The inspector discussed this

observation with the Shift Superintendent, who had the oil level corrected. This item is closed (50-361/88-11-03).

b. Emergency Chiller E-336 Operability Concerns (Unit 2)

While inspecting emergency chiller SA1513ME336 on April 22, 1988, the inspector observed that deficiency tag #084348 dated April 2, 1988, was hung near the cooler, identifying that the refrigerant level was low. The inspector observed that the refrigerant level was below the bottom of the sight glass and questioned the Shift Superintendent as to the operability of the emergency chiller in light of this condition. In reviewing Operating Instruction SO23-1-3.1 (TCN 7-9), titled Emergency Chilled Water System Operation, the Shift Superintendent found that the refrigerant level requirement for the cooler was only specified for an operating chiller, in which case the refrigerant was required to be at least 1/2 inch above the bottom of the cooler sight glass. The only other requirement that could be found relative to refrigerant charge was that the refrigerant pressure was required to be between 5 and 10 psig. The inspector requested the licensee to evaluate the low refrigerant level observed relative to ME-336.

On May 5, 1988, the licensee established an interim criterion that refrigerant must be visible in the cooler sight glass in order for the emergency chiller to be operable. TCN 7-10 was issued to Operating Instruction SO23-1-3.1, and emergency chiller ME-336 (Train A) was declared inoperable due to low Freon level at 7:45 a.m. on May 6. Because Train B Control Room Isolation Signal (CRIS) radiation monitor 2/3RT-7825 was inoperable at this time, CRIS (Train B) was manually actuated in order to start the Train B Control Room Emergency Air Clean Up System (CREACUS) to satisfy the requirements of Technical Specification LCO 3.7.5. At 8:00 a.m., Train B emergency chiller ME-335 (which had started automatically as a result of manual actuation of CRIS Train B) tripped on low refrigerant temperature. Although ME-335 had refrigerant visible in the cooler sight glass prior to operation, the licensee concluded that the chiller tripped due to insufficient refrigerant charge. The interim criterion for standby freon level was subsequently changed to 2 - 5 " in the sight glass. Because both emergency chillers were inoperable at this point, Technical Specification LCO 3.0.3 was entered and the licensee began to shut down Unit 2 at 8:59 a.m. Refrigerant was added to ME-336, the Train A emergency chiller was declared operable at 11:35 a.m., and Technical Specification LCO 3.0.3 was no longer applicable. Refrigerant was added to ME-335 and the Train B emergency chiller was declared operable at 2:20 p.m.

The inspector made the following observations with regard to the licensee's performance on this matter:

- Vendor Manual SO23-410-7-164-2, Revision A, titled "Operating Instructions for Carrier Centrifugal Refrigeration Machines", specifies a refrigerant (Freon-12) charge of 1745 pounds. Although the operator's duties specified by the vendor's manual

included maintaining proper refrigerant level, the licensee had not provided adequate instructions in this regard.

- When the licensee identified that the cooler refrigerant level was low for ME-336 on April 2, 1988, operability of the emergency chiller was not questioned and evaluated.

- Although the inspector questioned the operability of ME-336 on April 22, 1988, the licensee did not complete a preliminary evaluation of this condition until May 5, and ME-336 was not declared inoperable until May 6, 1988.

This item is unresolved pending completion of licensee action to evaluate refrigerant requirements for the emergency chillers (50-361/88-11-04).

Following the exit meeting, the Operations Manager stated that an effort was underway to improve operator performance in monitoring and evaluating the status of plant equipment. This effort was initiated, in part, due to the following observations previously expressed by the inspector:

- Poor assessment of CV-518 failure (paragraph 2.f of Unit 1 Inspection Report 50-206/87-29).

- Failure of operations shift personnel to understand the design basis and operability requirements for the auxiliary feedwater flow control valve backup nitrogen system (paragraph 8.b of Unit 1 Inspection Report 50-206/88-03).

- Failure of operations shift personnel to maintain proper diesel generator governor oil levels on Units 2 and 3 (paragraph 2.a of this report).

No violations or deviations in this area were noted during the inspection.

3. Evaluation of Plant Trips and Events (93702)

No plant trips or events occurred during this report period.

No violations or deviations in this area were noted during the inspection.

4. Monthly Surveillance Activities (61726)

a. Observation of Routine Surveillance Activities (Unit 1)

- SO1-II-1.80 Containment Isolation Channel Test

- SO1-12.3-10 Diesel Generator Load Test

- SO123-V-4.16 System Pressure Testing

The system pressure testing was a hydrostatic pressure test of the Safety Injection System (SIS) piping from the Main Feedwater Pump (MFP) discharge valves to the SIS isolation valves. The piping extends from the MFP to the isolation valves inside the containment and was filled with radioactive water from the refueling water storage tank (RWST). The objective of the test was to verify piping system integrity at 1750 psig in order to meet the ASME ten-year test requirement.

On May 11, 1988, the test was conducted by Station Technical Department per generic system hydrostatic test procedure SO123-V-4.16, revision 4-3, and supported by Operations Department. At the time of the test, the unit was in mode 5 and Operations aligned the SIS to support the test per procedure SO123-O-23, "Control of System Alignments," revision O-2. The plant instruments, including pressure indicator PI-911, were isolated from the portion of the SIS to be pressure tested. The pressure was monitored by two calibrated temporary gauges near the hydraulic test pump upstream of drain valve SIS-340 (which isolates the SIS from the test pump and pressure gauges).

During the test, difficulties were encountered and three different capacity pumps were tried to pressurize the SIS. In one test, when the SIS was pressurized to approximately 1600 psig, the test pump failed. After a brief delay, the equipment operator closed SIS-340 and the test was terminated. However, because SIS-340 was closed, the SIS pressure could not be monitored by the temporary pressure gauges. The equipment operator observed a 200 psig indication on PI-911 and obtained control operator concurrence to vent the SIS pressure with a high point vent valve. After a brief venting and filling up of the bottle placed by the vent valve, the operator noticed the indicated pressure on PI-911 did not change. Upon further verification, he found another valve was closed to isolate PI-911 from the SIS. When this valve was opened, PI-911 indicated approximately 650 psig and the equipment operator continued to vent the SIS pressure. Approximately three 5 gallon bottles of primary system water were collected.

The inspector expressed the following concerns to the licensee:

- The generic test procedure SO123-V-4.16, revision 4-3 did not provide adequate instruction -- in particular, how to exit the test under both normal and aborted test conditions.

- There was inadequate interface control between different departments involved in the test. For example, when the test was terminated by the testing group, Operations was left with the SIS pressurized with radioactive water of unknown pressure.

- Instrumentation was not made available to monitor SIS pressure after the test was aborted. This deficiency was corrected by the licensee during the subsequent test on May 12, 1988, by valving in PI-911 during the test.

- Health Physics coverage and control did not appear to be sufficient for a test of this nature (i.e. pressurization of an extensive piping system to 125% design pressure with radioactive water).

The licensee acknowledged the inspector's concerns and suspended further hydrostatic testing pending programmatic enhancements. This item remains open (50-206/88-13-01).

b. Observation of Routine Surveillance Activities (Unit 2)

- SO23-V-12.2.1 (TCN 6-4) — Core Protection Calculator Functional Test

The inspector observed the monthly functional test that was performed on core protection calculator channel B.

c. Observation of Routine Surveillance Activities (Unit 3)

- SO123-II-8.10.1 (TCN 1-3) — Electronic Loop Verification
- SO123-II-9.14 (TCN 0-3) — Electronic Differential Pressure and Pressure Transmitter Calibration

The inspector observed calibration of pressure transmitter 3PT-6464, component cooling water pressure to noncritical loop.

No violations or deviations were noted in this area during the inspection.

5. Monthly Maintenance Activities (62703)

a. Observation of Routine Maintenance Activities (Unit 1)

During this report period, the inspector observed the following maintenance activities:

- CW088042601000 — Install Yoke Restraint on CV-304 Valve Body
- M088042546003 — Repack FWS-CV-875A Valve After Leak Repair
- M08804213001 — Repair Position Indication for AFW-SV-3211 Valve

b. Observation of Routine Maintenance Activities (Units 2 & 3)

During this report period, the inspector observed the following maintenance activities:

- ° M087100700 Change Diesel-Generator Turbocharger Filter and Clean In-line Y Strainer (Unit 2)
- ° M088041686 Personnel Hatch Strong Back Installation for LLRT (Unit 2)
- ° M088041970 Steam Generator #2 High Water Level Trip Bistable Malfunction (Unit 3)

c. Use of Consumables (Unit 2)

During the maintenance that was being performed on diesel generator 2G-003 (M087100700), the inspector observed that nuclear grade locktite was used to seal threaded joints associated with the lube oil Y strainer. The licensee's maintenance order and work procedure did not call out the use of this substance. Additional followup inspection associated with this item will be conducted under previously identified open item 50-361/88-08-02.

d. Work Practices (Unit 3)

While inspecting the Unit 3 Safety Equipment Building, the inspector observed that maintenance was being conducted on room cooler 3ME-445, located in the pump room for high pressure safety injection (HPSI) pump 3P-018. The inspector noted that two mechanics were lying on the piping and supports surrounding the cooling unit, approximately 15 feet in the air. There was no scaffolding present, and evidently the mechanics had climbed up to the cooling unit by hanging onto piping and pipe supports. Athough equipment and piping supports did not appear to have been affected, the inspector discussed this observation with the Maintenance Supervisor. He stated that craft personnel would be reminded not to climb on equipment. This item is closed (50-362/88-11-01).

No violations or deviations were noted in this area during the inspection.

6. Engineered Safety Feature Walkdown (71710)

Unit 1

The inspector walked down the operable East train Residual Heat Removal (RHR) system while the unit was in Mode 5. The licensee's procedure SO1-4-37, "RHR System Alignment", was utilized for the system alignment verification. The inspector found a broken connector at the TR600 temperature transmitter at the -10 feet level inside containment. This deficiency was brought to the Shift Superintendent's attention who initiated a maintenance request for repair. This item is closed (50-206/88-13-02).

No violations or deviations were noted in this area during the inspection.

7. Refueling Activities (60705, 60710)

Unit 3 was taken off line on April 30, 1988, and the Cycle IV refueling outage was started. The unit entered mode 3 on April 30, modes 4 and 5 on May 1, and mode 6 on May 9. The outage was scheduled to last 78 days, with Unit 3 to return to service on July 16, 1988.

Review of Mid-Loop Operations (Unit 3)

On May 6, the inspector reviewed licensee activities associated with mid-loop operation. The inspector specifically reviewed the adequacy of licensee implementation of operational control over the establishment and maintenance of mid-loop conditions, as defined in station procedure S023-3-1.8 (Reactor Coolant System Draining). The inspector observed that plant operation was in full compliance with the requirements of the station procedure. Specifically, plant monitoring instrumentation had been properly calibrated and placed into service, all specified parameters were being maintained within allowable tolerances, and required surveillances were being performed.

The inspector raised the following concern relating to the adequacy of controls implemented to ensure the ability to secure containment within 4 hours of a loss of shutdown cooling, as required by procedure. Procedure S023-3-1.8 provided for an initial verification of containment closure capability (including containment penetrations as well as containment equipment or personnel hatches) prior to lowering water level below the top of the hot leg. However, the inspector also noted that the specified shiftly surveillance of containment closure capability only addressed hatches and not penetrations. The inspector noted that additional controls appeared to be warranted to ensure that maintenance activities affecting containment penetrations do not adversely impact containment closure capability during periods of extended mid loop operation. The Operations Manager stated that additional guidance would be provided to the plant operators to address the inspector's concern.

This item is closed (50-362/88-11-02).

8. Review of Licensee Event Reports (90712, 92700)

Through direct observations, discussion with licensee personnel, or review of the records, the following Licensee Event Reports (LERs) were closed:

Unit 1

88-02 Technical Specification Continuous Fire Watch Interrupted Due to Inadequate Post Orders

88-06 Backup Nitrogen System Not In Conformance with Design Criteria

Unit 2

86-23 Toxic Gas Isolation System (TGIS) Actuation

Unit 3

86-12 Fuel Handling Isolation System (FHIS) Spurious Actuations

87-01 R1 Snubbers Not Included in Snubber Surveillance Program Due to Oversight During Initial Program Development

9. Followup of Previously Identified Items (92701)

a. (Open) Open Item (50-206/87-29-05) Motor Operated Valve MOV 1202 Failure

This item involved the completion of root cause evaluation of a November 1987 failure of the Unit 1 electric auxiliary feedwater pump discharge valve (MOV 1201) to open during a surveillance test. The licensee had completed this root cause review and determined that the valve malfunction was due to inadequate valve operator worm gear lubrication. The licensee determined that the root cause of inadequate lubrication was the result of very high actuator speed (approximately 7,200 rpm) combined with several valve operations within a relatively short period of time. The combination of these conditions contributed to localized loss of lubricant.

As an interim corrective action, the licensee implemented a higher grease fill in the valve actuator. Periodic inspections of the worm gear assembly have demonstrated satisfactory lubrication following valve operation. The licensee will continue this practice pending final corrective action, which will involve replacement of the valve actuator with a slower speed actuator during the Cycle X refueling outage. The licensee has also reviewed existing high speed actuators for all three units and has implemented an inspection program to confirm whether similar modifications are warranted for other valve actuators.

This item also addressed a problem involving the use of thermal overload devices on valves MOV 1202 and MOV 1204. In particular, the inspector questioned why these devices were installed when the licensee has committed to remove thermal overload devices from safety related valves. The licensee is continuing a root cause review of this problem. The inspector requested that the licensee complete this review and address any necessary corrective actions prior to Unit 1 restart from the mid cycle outage.

This item remains open, pending completion of licensee action.

b. (Closed) Open Item (50-206/88-03-02) Single Failure Compensatory Actions

This item involved an NRC concern with the adequacy of a compensatory action procedure implemented by the licensee as part of a justification for continued operation following the identification of safety system single failure problems on Unit 1. In particular, the licensee implemented a special procedure to manually shift safety injection flow in the event of failure of an automatic safety injection valve. The specific concern questioned whether HV851 should be operated with flow through the valve, as specified in the October 1987 issue of the special procedure. The licensee stated that this deficiency was recognized internally and the procedure was corrected in December, 1987 to require both feed pumps to be stopped prior to repositioning HV851. This item is closed.

c. (Closed) Special Item (50-206/88-00-01), Potential Diesel Generator Failure

In a letter dated December 3, 1987, Imo Delaval Inc. notified the NRC and its users of a defect found at Gulf States Utilities. This defect concerned a wound rotor pole in the generator manufactured by NEI Peebles - Electric Products Inc. and supplied to the users through Imo. A 10CFR21 report was made on November 16, 1987. To assess the generic implication of this defect, Imo recommended that its users visually inspect the generator rotor pole for damage.

The licensee conducted the recommended inspection in March 1988, per MO87121656 and MO87121657, and did not find any damage. Furthermore, the licensee stated that the engine speed at SONGS-1 is 450 RPM while at Gulf States Utilities is 900 RPM, thus the SONGS generator was less susceptible to the failure.

This item is closed.

c. (Closed) Followup Item (50-361/86-11-01), Identification of Abandoned Electrical Circuits

TCN 0-22 was issued to Maintenance Procedure SO123-I-4.59, titled Wire and Cable Termination, to require engineering resolution of abandoned circuits that are not labelled as such. This item is closed.

d. (Closed) Followup Item (50-361/86-19-03), Use of Uncalibrated Instruments

The licensee's maintenance department has taken steps to remove uncalibrated measuring and test equipment (M&TE) from the facility, and additional guidance has been provided to maintenance personnel regarding the requirements for use of M&TE. In response to corrective action report (CAR) SO-P-1068 (which was issued to address failure of maintenance personnel to respond to the M&TE recall system), TCN 1-9 was issued to Instrument and Test Procedure

SO123-II-1.0, titled Calibration and Control of Measure and Test Equipment, to require more rigorous administrative controls in this area. This item is closed.

e. (Closed) Followup Item (50-361/87-04-01), Control of Maintenance Near Operable Safety Related Equipment

In order to address the inspector's concerns, the Maintenance Manager issued a memo dated March 28, 1988, to all maintenance supervisors to provide additional guidance in this area. In addition, operations personnel have been instructed to identify and report any items that are not properly secured. This item is closed.

f. (Closed) Violation (50-362/85-26-01), Inadequate 50.59 Review of Temporary Scaffolding and Electrical Cable Installation

This item remained open pending licensee action to provide adequate procedures for controlling scaffolding and temporary electrical cable installations. The inspector reviewed the following procedures in this regard:

SO123-I-1.34 (TCN 1-1)	Scaffolding - Scaffolding Erection
SO123-I-1.36 (Rev. 0)	Cables - Installation of Temporary Cables

The inspector was satisfied that the licensee had taken appropriate action to address this issue. This item is closed.

g. (Closed) Followup Item (50-362/85-30-01), Large Number of Invalid Annunciators During Mode 6

The Operations Manager evaluated this condition and did not believe that actions are needed to effect changes to the annunciator panels. The inspector acknowledged the comments, noting that recent annunciator problems had not been observed. This item is closed.

10. Exit Meeting (30703)

On May 13, 1988, an exit meeting was conducted with the licensee representatives identified in Paragraph 1. The inspectors summarized the inspection scope and findings as described in the Results section of this report.

The licensee acknowledged the inspection findings and noted that appropriate corrective actions would be implemented where warranted. The licensee did not identify as proprietary any of the information provided to or reviewed by the inspectors during this inspection.