U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-206/89-01, 50-361/89-01, 50-362/89-01

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: January 8 through February 18, 1989

Inspectors: G. W. Cuthbertson FOR — 3/23/89
F. R. Huey, Senior Resident Inspector, Units 1, 2 and 3 — Date Signed

G. W. Cuthbertson FOR — 3/23/89
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G. W. Cuthbertson FOR — 3/23/89
A. L. Hon, Resident Inspector — Date Signed

Approved By: G. W. Cuthbertson FOR — 3/23/89
P. H. Johnson, Chief, Reactor Projects Section 3 — Date Signed

Inspection Summary

Inspection on January 8 through February 18, 1989 (Report Nos. 50-206/89-01, 50-361/89-01, 50-362/89-01)

Areas Inspected: Routine resident inspection of Units 1, 2 and 3 Operations Program including the following areas: operational safety verification, radiological protection, security, evaluation of plant trips and events, monthly surveillance activities, monthly maintenance activities, refueling activities, independent inspection, licensee events report review, and follow-up of previously identified items. Inspection procedures 30703, 35502, 37700, 37828, 40500, 60710, 61715, 61726, 62703, 71707, 71710, 90712, 92700, 92701, 92702 and 93702 were covered.

Safety Issues Management System (SIMS) Items: None

Results:

General Conclusions and Specific Findings:

1. The Unit 2 trip which occurred during reactor plant startup on January 9, 1989 identified operator errors which indicated the need for additional licensee emphasis. In particular (Paragraph 4):

   a. Plant operators did not understand the operation of plant annunciators associated with the plant protection system.

   b. Although plant operators were unsure of plant annunciator indications during the reactor startup, they failed to stop and request knowledgeable assistance.

   c. Plant operators did not comply with station administrative procedures which would have prevented plant operation outside the limits defined in the plant technical specifications.

2. The licensee has identified numerous Unit 1 plant design deficiencies, single failure mechanisms, and environmental qualification problems which indicate the need for an overall evaluation of the readiness of Unit 1 for restart following the current Cycle X refueling outage (Paragraph 8.d).

3. A violation observed during the inspection indicated a need for the licensee to provide additional attention to implementation of foreign material exclusion controls during maintenance activities (Paragraph 6.d).

4. Deficiencies were noted which indicate the need for the licensee to provide additional attention to proper documentation of equipment deficiencies (Paragraph 6.e).

5. Deficiencies were noted which indicate the need for the licensee to complete a safety analysis which ensures that the plant is properly protected in the event of worst case multiple control rod misalignments (Paragraph 3.a).

Significant Safety Matters: None

Summary of Violations:

1. Failure to implement foreign material exclusion controls as required by station procedure (Paragraph 6.d).

Open Items Summary:

During this report period, 2 new followup items were opened and 9 were closed.

DETAILS

1. Persons Contacted

Southern California Edison Company

*C. McCarthy, Vice President, Site Manager
*H. Morgan, Station Manager
D. Herbst, 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. Schramm, Operations Superintendent, Unit 1
V. Fisher, Operations Superintendent, Units 2/3
L. Cash, Maintenance Manager, Unit 1
R. Santosuosso, Maintenance Manager, Units 2/3
C. Chiu, Assistant Technical Manager
*R. Plappert, Compliance Manager
*C. Couser, Compliance Engineer

*Denotes those attending the exit meeting on February 15, 1989.

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. Plant Status

Unit 1

The plant remained shutdown for the Cycle X refueling outage throughout the inspection period.

Unit 2

The plant operated at full power until January 11, 1989, when the unit was shut down to repair auxiliary feedwater pump 2MP-141. The plant was returned to power operation on February 13, 1989.

Unit 3

The unit was returned to power operation on January 9, 1989, following a January 6 reactor trip, resulting from an electrical fault in the non-1E uninteruptible power supply. On February 5, 1989, a tube leak was detected in steam generator 3E-089. The leak rate stabilized at 60 to 70 gallons per day. Assuming that the rate of leakage does not worsen,

the licensee plans to repair the leaking tube during the next outage of sufficient duration to complete the repair.

3. Operational Safety Verification (71707)

The inspectors performed several plant tours and verified the operability of selected emergency systems, reviewed the tagout 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. Safety Evaluation of Multiple Control Rod Drops (Units 2/3)

Following a December 1988 incident at Palo Verde Nuclear Generating Station, which involved the inadvertent dropping of two control rods into the core during power operation, the inspector initiated a review of protective measures implemented at San Onofre Units 2 and 3 for multiple control rod (CEA) misalignments.

The inspector noted that the Combustion Engineering (CE) safety analysis for the San Onofre core protection calculators (CPCs) and control rod position monitoring equipment (CEACs) do not account for multiple control rod drops, since such an event is not considered to be credible. Furthermore, unlike Palo Verde, the San Onofre CPCs have been modified to eliminate any penalty factor for inward control rod deviations.

In addition to the December 1988 Palo Verde event, the inspector noted that in July 1986, San Onofre Unit 2 experienced a similar incident involving the dropping of two control rods into the core during power operation. Since there have been two examples of events which are currently assumed to be incredible, the inspector discussed with the licensee the need to complete a safety evaluation of the effect of worst case multiple rod misalignments at San Onofre. The licensee stated that they were confident that differences in core designs between Palo Verde and San Onofre will ensure core safety during any anticipated multiple control rod misalignments. However, the licensee agreed that a specific safety analysis should be performed to confirm this belief. The licensee stated that an analysis would be completed in March 1989.

This item remains open, pending completion of additional licensee action (361/89-01-01).

b. Proper Documentation of Resolution of Plant Restart Concerns

Following the January 6, 1989, Unit 3 reactor trip, resulting from an electrical fault in the non-1E uninteruptible power supply, the

licensee determined that the Channel 1 and Channel 4 steam generator level trip signals were approximately 1.3 and 0.9 seconds slow, respectively.

Although the licensee had completed analyses that established that the steam generator level transmitters had performed properly, this evaluation was not documented in the post-trip review package and the plant was returned to power operation with questions involving proper level instrument performance still not clearly understood by station management. During subsequent discussion with the inspector, the licensee demonstrated that the phenomenon with apparently slow level transmitter response was the result of post-trip hydrodynamic effects in the steam generator. The phenomenon is frequently seen in the channels which do not result in the reactor trip.

During discussion with the inspector, the licensee agreed that the resolution of all technical concerns resulting from a plant trip would be clearly documented in the post trip evaluation package prior to unit return to service.

This item is closed (362/89-01-01).

No violations or deviations were identified.

4. Evaluation of Plant Trips and Events (93702)

a. Unit-2 Trip During Plant Restart

On February 9, 1989, plant operators were preparing for a Unit 2 reactor startup following the completion of auxiliary feedwater pump repairs. During the performance of a Mode 2 entry surveillance on the Core Protection Calculators (CPCs), the operator noted that all four Sensor Failure alarms and four CPC Failure alarms were energized on the plant annunciator panel. However, the operator also noted that the local CPC Module did not indicate any alarms for these conditions. The surveillance was marked "UNSAT". After discussion among the unit's operating shift crew, it was concluded that these alarm conditions were normal. Although the surveillance was marked "UNSAT", the operators continued with preparations for Mode 2 entry, since they expected that these alarms would clear once the CEA groups 1, 2 and 3 were fully withdrawn. The fact that Mode 2 entry would occur prior to group 3 CEA being fully withdrawn was not discussed.

When the reactor was stabilized in Mode 2 at 5E-4% power for the documentation of criticality data, the operators noted that the CPC annunciators were still energized. At this time, the operability of the CPC was again questioned and an operator was sent to investigate the discrepancy between the plant annunciator panel and the CPC local modules. The operator checked the plant annunciator panel switches and reported that they were in the proper position. At this point, after consultation with the Station Technical

Advisor and a core analysis engineer, the Shift Superintendent (SS) declared the CPCs to be inoperable and initiated a plant shutdown in accordance with the requirements of technical specification 3.0.3.

In their haste to perform the shutdown, plant operators did not refer to the appropriate plant shutdown procedure and therefore neglected to bypass the CEAC (rod position) inputs to the CPCs prior to reducing power below 1E-5%. As a result, penalty factors generated by the CEACs caused the reactor to trip on an integrated radial peaking factor auxiliary trip. Standard post-trip actions were implemented without encountering further problems.

Subsequent inspection by plant electricians revealed that the switches on all eight plant annunciator alarms were open, resulting in the alarms being continuously energized. Accordingly, it was concluded that there had been no problem with the CPCs. Had the problem with the plant annunciator switches been recognized earlier, the alarms would have been cleared prior to Mode 2 entry and the above problems would not have occurred.

The licensee initiated the post-trip review process and identified the following deficiencies and lessons learned:

- Plant operators did not understand the operation of plant annunciators associated with the plant protection system.

- Although plant operators were unsure of plant annunciator indications during the reactor startup, they failed to stop and request knowledgeable assistance.

- The CPC surveillance procedure was not properly followed. Plant operators proceeded with Mode 2 entry in spite of an "UNSAT" surveillance.

- The procedure for alarm compensatory action (ACA) was inadequately written and followed. The CPC alarm switches were opened without proper logging and stickers. Consequently, their status was unknown to subsequent operating crews.

- When it was decided to return to Mode 3, the operation was hastily performed without conducting a tailboard meeting or using the plant shutdown procedure. Consequently, the CPCs were not properly bypassed and resulted in a reactor trip.

The licensee corrected the above deficiencies and the unit was successfully restarted on February 11, 1989. Actions taken by the licensee included a series of management briefings for all operating crews regarding the event and the importance of (1) following established procedures and (2) stopping to obtain qualified assistance when uncertain conditions are encountered.

Although this event indicated a serious lapse in the proper implementation of station procedures, the inspectors noted that prompt and aggressive station management involvement in this event resulted in thorough identification, reporting and correction of all of the problems. Accordingly, NRC enforcement action was not considered to be warranted.

b. Spurious Engineered Safety Features (ESF) Actuation During Testing (Unit 2)

On February 18, 1989, while performing a 31-day logic matrix surveillance test per procedure S023-II-1.15, Engineered Safety Feature Actuation System (ESFAS), a spurious auxiliary feedwater system actuation occurred. All equipment performed properly. No auxiliary feedwater was actually added to the steam generators (SGs) because the control valves were closed in the absence of an actual low SG level.

The logic matrix test was being performed to verify proper operation of the logic matrices, using a test pushbutton on the Plant Protection System (PPS) cabinet. Depressing and holding the matrix test button applies a test voltage to energize the test system hold coils of the selected double coil matrix output relays. These matrix output relays are normally activated by energizing the primary coil with power supplied through the closed bistable trip relays. During the surveillance, when the bistable trip relays act to deenergize the primary coils, the matrix output relays are held in by the hold coils. The bistable trip relays also have double coils and can be opened by applying a test voltage of opposite polarity to the test coil. The contacts to energize the hold coils and the test coils are operated by the test pushbutton switch, with the former leading the latter by about 200 milliseconds.

The licensee investigated the spurious actuation by monitoring the operation of the test switch using a recorder. This showed that during some tests the time delay to deenergize the test coil after the hold coil was energized almost did not exist. This observation and the absence of other apparent failure modes suggested an intermittently defective test switch. This test switch was replaced by the licensee.

The licensee had recognized prior to this event that this design presented vulnerability to spurious actuations, and initiated a study of a possible alternative design. The licensee was planning to implement an appropriate change after the design evaluation is finalized and reviewed.

No violations or deviations were identified.

5. Monthly Surveillance Activities (61726)

During this report period, the inspectors observed or conducted inspection of the following surveillance activities:

a. Observation of Routine Surveillance Activities (Unit 1)

SO123-II-8.10.1 (MO 88102130)	Functional Loop Verification Refueling Water Storage Tank [S1-CRS-LI-3020]
SO123-II-11.152 (MO 87101281)	Circuit Device Tests and Overall Functional Test [Inverter No. 4A]
SO123-XXVI-6.4.14 (MO 89010857)	Generic Test Procedure for Circuit and Calibration Tests [Station Service Transformer No. 3 Circuit Breaker S1-152-11C11]
MO 88100354	Station Loss of Voltage Automatic Transfer System Test
SO1-12.8-18 (TCN 2-4)	PORV and Block Valve Backup Nitrogen Supply Test
SO1-12.4-4 (TCN 2-3)	PORV Block Valve Operability Test
SO1-12.8-9 (TCN 4-2) (Attachment 4)	No. 1 Diesel Generator Level Rejection Test

b. Observation of Routine Surveillance Activities (Unit 2)

SO23-3-3.23 (TCN 6-15)	Monthly Surveillance of 2G002 Diesel Generator
SO23-5-1.3.1 (TCN 11-13)	Plant Startup from Hot Standby to Minimum Load

c. Observation of Routine Surveillance Activities (Unit 3)

SO23-II-1.1.5 (Rev 1)	Surveillance Requirement Reactor Plant Protection System Logic Matrix Functional Test

No violations or deviations were identified.

6. Monthly Maintenance Activities (62703)

During this report period, the inspectors observed or conducted inspection of the following maintenance activities:

a. Observation of Routine Maintenance Activities (Unit 1)

MO 87080466	Perform MOVATS on SIS-MOV-358
MO 89010499	Turbo Charger Coolant Leak on Diesel Generator No. 2

MO 89012667	Degraded Insulation between Pedestal Bearing and Support Structure for Diesel Generator No. 1
MO 88091402	Remove Furmanite Clamp and Perform Permanent Repairs to the West Feedwater Pump Discharge Flange
MO 87101282	Clean and Inspect Vital Bus Inverter No. 4A
MO 88121988	Vital Bus Inverter No. 4A Puts Out 61 Hz Vice 60 Hz
MO 89012190	Perform Timing Test of Feedwater Pump B Breaker S1-152-11C04

b. Observation of Routine Maintenance Activities (Unit 2)

MO89012140000	Troubleshooting Radiation Monitor 2RISH7848 Spurious Instrument Failure.
MO88121632001	Reassembly of MSIV 2HV8204 After Inspection
MO89021009000	Repair MSIV 2HV8205 Valve Stem Hydraulic Packing Leak

c. Observation of Routine Maintenance Activities (Unit 3)

MO89020111000	Inspect AFW Pump 3MP504

d. Inadequate Implementation of Foreign Material Exclusion (FME) Controls (Unit 1)

During the Unit 3 refueling outage in June 1988, the licensee experienced numerous problems with loss of control of foreign material within the reactor vessel and refueling cavity. Considering these problems, the inspector conducted several observations of FME controls implemented by the licensee during the Unit 1 Cycle X refueling outage. In particular, the inspector observed maintenance activities associated with the emergency diesel generators. Observations performed during several stages of maintenance activities inside the diesel generator crankcase indicated that the licensee had properly implemented FME program controls. In particular, the inspector noted that the licensee had implemented appropriate FME boundary controls for the work being performed and personnel involved in the maintenance activities appeared to be knowledgeable of applicable FME requirements.

On January 31, 1988, the inspector noted that the licensee had experienced a loss of FME control on diesel generator #1. Specifically, a screwdriver had been lost inside of the generator stator assembly and a subsequent rotation of the generator rotor assembly had broken the screwdriver, resulting in the release of

several broken screwdriver pieces within the generator stator assembly. The inspector reviewed licensee nonconformance reports (NCRs) and noted other instances of FME control problems associated with the diesel generator (e.g. NCR SO1-P-6815, main bearing temperature detector) in addition to the screwdriver problem (NCR SO1-P-7008). Considering these additional indications of FME control problems, the inspector conducted additional review of Unit 1 FME controls:

(1) Review of the circumstances associated with the screwdriver problem identified that the broken screwdriver had been discovered as the result of follow up actions conducted by the licensee in response to FME concerns expressed by the Unit 1 maintenance manager. The maintenance manager had noted that FME barrier controls did not appear to be appropriate for the type of work being conducted on the generator stator assembly. In particular, licensee maintenance personnel had not implemented "Option 3" FME controls in accordance with station maintenance procedure SO123-I-1.18, Foreign Material Exclusion Controls, which required enhanced controls for work involving the potential for undetected loss of material inside plant equipment. The maintenance manager had requested that "Option 3" controls be implemented and the broken screwdriver was discovered during the implementation of these enhanced controls.

(2) On January 31, the inspector toured the #1 diesel generator to observe licensee corrective actions subsequent to the screwdriver problem. During this tour, the inspector observed several deficiencies associated with improper implementation of FME control requirements. Specifically:

(a) FME barriers and posting, as required by station procedure SO123-I-1.18, were not properly implemented in the vicinity of the #1 diesel generator. In particular, there were no barriers or postings on the north side of the diesel generator stator assembly, which had been designated as an "Option 3" FME control area, and an FME monitor was not in the immediate area to enforce proper controls. The improper posting resulted in inadvertent inspector entry into the FME control area without required personnel FME controls being implemented.

(b) The inspector observed another licensee worker inside the designated FME control area without required personnel FME controls being implemented.

(c) The maintenance technician who had been authorized to perform work inside the FME control area (and who was properly dressed) did not challenge personnel inside the FME control area who were not properly dressed.

(d) When the inspector questioned the assigned FME monitor as to the posting of the diesel generator stator area, she stated that the FME control area should have been posted on both the north and south sides of the stator assembly. A subsequent tour of the area by the inspector and monitor identified that the north boundary had fallen down or been improperly removed. The inspector noted that the barrier had consisted of red FME barrier tape, with duct tape at either end.

(3) During his review of the above concerns, the inspector determined that the Independent Safety Engineering Group (ISEG) had been previously requested by the station maintenance manager to perform an independent audit of FME controls during the Unit 1 Cycle X refueling.

In an effort to determine if ISEG had identified similar FME control problems to those noted above, the inspector reviewed the progress of the ISEG audit with the ISEG supervisor and the involved ISEG engineer. Although the ISEG audit was not yet complete, it appeared to the inspector that the ISEG audit was directed more toward an adequacy review of the FME procedure and FME training than toward field implementation of FME requirements. The inspector noted that a more "performance based" audit would appear to be better suited to identify problems similar to those noted by the inspector. A subsequent discussion with the licensee's quality assurance manager established that the licensee intends to have ISEG engineers participate in a "performance based" audit training program developed by the licensee's quality control organization.

The inspector discussed the above concerns with the station maintenance manager. The inspector acknowledged that the licensee's maintenance department has made significant strides to improve the performance of FME controls during the current Unit 1 outage. In particular, the inspector noted the initiative taken by the maintenance department to have ISEG perform an independent FME assessment, and actions taken by the Unit 1 maintenance manager in identifying the screwdriver problem before damage to the equipment resulted. However, the program implementation problems noted by the inspector indicated the need for additional attention. In particular, the inspector requested that the licensee consider additional attention to formalizing the types of barriers used for FME control areas (similar to improvements implemented by the licensee health physics department following problems with their barriers). The inspector also addressed the need to reinforce FME training requirements with regard to challenge of personnel who are not in compliance with applicable FME controls. The licensee stated that these concerns would be promptly addressed.

The failure to properly implement FME controls as required by the station procedure was identified to the licensee as an apparent violation (206/89-01-01).

e. Deficiency Identification During Maintenance Activities

On January 31, 1989, the inspector observed maintenance activities to replace power supplies in channel C of the Unit 2 plant protection system (PPS). During this review, the inspector noted that two of the cable bundles in the cabinet were frayed. In particular, it appeared that the outer plastic wrapping on the cable bundle had been torn by interference with components on the door of the cabinet. The inspector questioned the maintenance technician performing the power supply replacement about the frayed cables. The technician stated that he had not noted the problem; however, he would discuss it with his supervisor.

On February 6, 1989, the inspector performed a follow up inspection of the channel C PPS cabinet, following completion of maintenance activities inside the cabinet. The inspector noted that the same cable fraying deficiencies still existed.

The inspector reviewed maintenance requests associated with the PPS cabinets and could not locate any documentation of the observed channel C PPS cable deficiencies. The inspector discussed the above concern with the Unit 2/3 instrumentation supervisor, maintenance manager, and the station assistant technical manager. The inspector also commented that the licensee should consider reemphasis of the need to carefully inspect adjacent areas for deficiencies when specific work activities are in progress. The instrumentation supervisor stated that, although the specific deficiency was not documented in the power supply replacement maintenance order, it was not an operability problem, and repair of the observed cable deficiency was captured in a blanket maintenance order which had been initiated to correct such deficiencies. The inspector commented that such a policy could easily result in specific deficiencies being overlooked during subsequent repairs, and noted that it would seem more prudent to specifically document any observed deficiency in the applicable maintenance order. The instrumentation supervisor stated that he agreed and would ensure that all deficiencies are specifically documented in the appropriate maintenance order. The assistant technical manager stated that the above concerns would also be stressed as a part of station personnel training associated with the licensee's trip reduction program.

This item is closed (361/89-01-02).

f. Auxiliary Feedwater Pump Repair (Unit 2)

On January 11, 1989, during routine operability surveillance of motor driven auxiliary feedwater (AFW) pump 2MP-141, the pump tripped on overcurrent shortly after it was started. The licensee found the overcurrent trip was caused by grounded motor field windings, resulting from a metal stiffener which had separated from the motor stator. The Siemens-Allis motor was sent to a Westinghouse motor facility for further failure investigation and overhaul.

The licensee attributed the stiffener detachment to faulty resistance welds during the manufacturing process. Two of the 48 stiffeners were found detached and a number of welds associated with other stiffeners showed evidence of a resin covering at the weld joint. This would indicate that the welds were faulty before the stator received the resin insulation at the manufacturing facility.

The licensee replaced the damaged stator core with a new one and the motor was satisfactorily tested and returned to service. To assess the potential generic implication of this deficiency, the licensee inspected the motors for pumps 2MP504 and 3MP504 and did not find similar problems.

This item is closed (361/89-01-03).

g. Main Steam Isolation Valve Inspection (Unit 2)

In accordance with previous commitments to the NRC, the licensee inspected main steam isolation valves (MSIVs) 2HV8204 and 2HV8205 with a borescope during the Unit 2 AFW pump outage. During borescopic inspection of the 2HV8204 valve cavity, at least two broken capscrew heads were believed to be observed. Accordingly, the licensee decided to disassemble the valve. MSIV 2HV8205 was not disassembled since the borescopic inspection did not indicate any loose parts.

Disassembly of valve 2HV8204 identified that all cap screws were intact in spite of borescopic indications to the contrary. The valve was reassembled and declared operable after it passed applicable surveillance tests.

This item is closed (361/89-01-04).

h. Containment Isolation Valve Test (Unit 2)

NRC Information Notice 88-73, "Direction Dependent Leak Characteristics of Containment Purge Valves" identified a potential generic problem with Fisher Control valves. The problem was identified at Diablo Canyon Nuclear Power Plant, where a 48" inboard purge valve exhibited excessive leakage when pressurized from inside the containment during an integrated containment leak rate test (ILRT). The valve had previously passed the Local Leak Rate Test (LLRT), when it was pressurized from the opposite direction between the inboard and outboard valves. It was suspected that the seating tightness of this type of valve depended on the direction the disc was pressurized. The LLRT tended to aid the leak tightness of the sealing surface while the ILRT tended to unseat the sealing surface.

During the AFW pump outage, the licensee tested both the 42" and the 8" purge valves from the ILRT direction and leakage was compared with previous LLRT results. The licensee determined that

the SONGS valves did not exhibit significant preferential seating as did those at Diablo Canyon. The licensee suspected the difference was cause by the following factors:

- The preferential seating depended on the valve size. The SONGS valves are smaller.

- Leakage also seems to depend on the amount of valve wear. The 48" valve at Diablo Canyon had been stroked frequently during plant operation. The 42" purge valves at SONGS were locked closed during Modes 1 through 4 and were opened only during plant shutdowns. The 8" valves at SONGS were also infrequently stroked, as they were used only for venting and purging of containment. From the maintenance history, the valves have maintained their tightness over 14 months and 54 strokes, without requiring adjustments.

Accordingly, the licensee concluded that the current condition of the purge valves was satisfactory. As for long term corrective actions, the licensee planned to perform a leak test on the inboard valve in the ILRT direction during each plant shutdown of sufficient duration. The licensee also planned to develop a design change to eliminate the preferential seating concerns during the next refueling outage.

This item is closed (361/89-01-05).

i. Thermowell Leak Repair (Unit 2)

During the AFW pump outage, the licensee attempted to replace a cold leg resistant temperature detector (RTD) for 2TE0115-2 and 2TE0915-2 temperature elements. These detectors are used for remote shutdown panel and post accident monitoring indications. While removing the RTD from the thermowell, the tip of the RTD broke off and remained inside the thermowell. In order to remove the broken tip, the licensee developed a plan to carefully drill and tap the tip for removal with a threaded tool. Recognizing the potential for a reactor coolant system (RCS) boundary breach during the repair, the licensee staged a backup damage control plug. During the drilling operation, the thermowell was inadvertently breached and a steady stream of water was observed. The thermowell was promptly plugged and the personnel evacuated the area without significant contamination.

The licensee initiated a temporary facility modification (TFM) to temporarily abandon the damaged thermowell and utilize an adjacent thermowell. The damaged well was plugged with a threaded plug in place of the RTD and seal welded according to the appropriate codes. The single element RTD 2TE09152 in the adjacent thermowell was replaced with a dual element RTD. The second element of this RTD was used for the 2TE0915 and 2TE01152 signals after the proper safety analysis and environmental qualification upgrades were performed. The licensee planned to restore the system to the

original configuration during the next refueling outage by replacing the damaged thermowell. The final root cause of the thermowell damage will also be determined after it is removed from the cold leg nozzle.

This item is closed (361/89-01-06).

One violation was identified, as discussed in paragraph 6.d above.

7. Engineered Safety Feature Walkdown (71710)

Unit-2

During this inspection period, the inspector walked down the Unit 2 containment system to verify containment integrity. Station procedure SO23-3-3.10 (TCN 5-9) "Monthly Containment Penetration Checks" was utilized.

No violations or deviations were identified.

8. Plant Modification and Refueling Activities (37700, 37828, 60705, 60710, 71711, 72700)

a. Cycle X Refueling Activities (Unit 1)

During this report period, Unit 1 remained shutdown for Cycle X refueling activities. Fuel movement was completed on January 12, 1989, and the unit entered Mode 5 on January 29. The inspector observed refueling activities and verified that they were properly conducted in accordance with Outage and Maintenance Support Procedure SO1-X-7 (Nuclear Fuel Movement, Unit 1).

b. Spent Fuel Transshipment (Unit 1)

During the current outage, the licensee proceeded to ship spent fuel from the Unit 1 spent fuel pool (SFP) to the SFPs for Units 2 and 3. A total of 140 fuel bundles were shipped. Prior to transshipment of fuel, Unit 1 did not have sufficient storage capacity available in the SFP for a complete core offload. This activity was well organized and was conducted without incident. The inspector verified that fuel transshipment was conducted in accordance with Special Nuclear Material Procedure SO123-X-0, Transshipment of Spent Fuel.

This item is closed (206/89-01-02).

c. Plant Modifications (Unit 1)

During the current outage, the inspector reviewed design change packages (DCPs), observed testing and performed as-built verifications relative to the following DCPs:

DCP 3481 Emergency Diesel Generator Slow Start

DCP 3364 Auxiliary Feedwater System Modifications

DCP 5113 480 Volt Switchgear Bus-tie Breaker Trip on Safety Injection/Loss of Power (SIS/LOP)

DCP 3003 Nuclear Instrumentation System Upgrade

The inspector observed that these activities appeared to be well controlled and executed.

d. Restart Concerns (Unit 1)

A number of technical issues have been identified which require licensee resolution prior to Unit 1 restart. The specific technical issues were discussed in a confirmatory action letter issued by Region V, dated January 31, 1989, and in a subsequent letter issued by Region V on February 8. The following issues are included in those identified for resolution prior to Unit 1 restart:

- Thermal Shield Integrity
- Various Single Failure and EQ Problems
- Various Plant Design Discrepancies that have been identified during the current outage

These items will be addressed in a future inspection report.

No violations or deviations were identified.

9. Independent Inspection (37700)

Potential 10 CFR 21 Report By EATON Electrical Corporation

On July 6, 1988, EATON Electrical Corporation sent a letter to six nuclear power plants regarding a problem found at the Limerick Nuclear Power Plant. The anomaly involved cracked conical washers and the stab aluminum bus interface mechanism used in the Cutler-Hammer Motor Control Center (MCC) at Limerick. Eaton searched its records and identified SONGS 2 & 3 as one of licensees that had purchased MCCs susceptible to this anomaly.

The licensee reviewed the subject MCCs used at SONGS and found that none were safety related. Therefore, no evaluation for 10CFR21 reportability was deemed necessary. The licensee plans to eventually replace the aluminum bus bars as a long term corrective action.

This item is closed (361/89-01-07).

No violations or deviations were identified.

10. 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

87-06 R1 Environmental Qualification of Butt Splice Connectors

88-04 R1 Failure of Solenoid Valve SV-3900 for Safety Injection Isolation Valve HV-851B

88-17 Potential Non-Conservatism with Technical Specification Requirement for Auxiliary Feedwater Storage Tank Volume due to Calculation Oversight

88-19 ESF Susceptible to Single Failure as the Result of Design Deficiencies

88-20 Steam Generator Wide Range Level Indication System Contrary to Post-TMI Design Requirements

89-01 Reactor Vessel Thermal Shield Support Block Bolts Out of Tolerance

Unit 2

88-32 Spurious TGIS -- Failed NH4 Channel

88-34 CCW Valves Subject to Seismic Common Mode Failure

88-35 Over 100% Actual Power -- Degradation of Feedwater Flow Venturi

Unit 3

88-11 Inadequate Air Ejector Radioactivity Sample

88-12 FHIS Train A Spurious Actuation Induced -- Test of CPIS Train A Monitor

89-02 Spurious FHIS Actuation

No violations or deviations were identified.

11. Follow-Up of Previously Identified Items (92701)

a. (Closed) Open Item (206/87-29-03), Plant Material Condition Problems

Previously, the inspector had observed that numerous housekeeping and material plant condition deficiencies existed. The inspector

continued to monitor licensee performance in this area during subsequent inspections, and additional problems have not been identified. This item is closed.

b. (Open) Open Item (206/87-29-04), Control of Temporary Plant Modifications

This item remains open pending licensee action.

c. (Open) Open Item (206/87-29-06), Safety Injection Interlock -- 50.59 Review of Design Change

This item remains open pending licensee action.

d. (Open) Open Item (206/87-29-08), Problems with Control of Plant Conditions and Determination of Root Cause

This item remains open pending licensee action.

e. (Closed) Violation (206/88-24-03), Inadequate Control of Maintenance Activities on Environmentally Qualified Equipment

With regard to the use of electrical tape to repair damaged conduit on safety injection valve HV-852B, the licensee could not identify any specific maintenance activity where this repair was documented. The licensee speculated that the repair was made some time ago by an individual who failed to recognize that EQ equipment was involved and that special repair instructions were required. The licensee believes that this is a failing of the training program and plans to complete the following actions by March 31, 1989:

1. Provide a description of this unauthorized repair of EQ equipment to appropriate maintenance personnel.

2. Discuss this event at the next quarterly crew meeting with appropriate maintenance personnel.

3. Review and enhance, as appropriate, the maintenance program relative to this event.

The licensee's planned corrective actions to address this specific issue appear to be acceptable, and this item is closed.

f. (Closed) Unresolved Item (206/88-03-07), Failure to Implement EQ Program Requirements

A special inspection was conducted relative to this issue and documented in Inspection Report 206/88-10. As a result of the special inspection, enforcement action was taken and additional inspector followup was documented under enforcement item 206/88-10-01. This item is closed.

g. (Closed) Violation (361/88-27-02) Inadequate Calibration Program for Safety Related Alarm Devices (Units 2 and 3)

This violation identified that the licensee's periodic calibration program failed to include a number of Agastat time delay relays since plant startup. These relays required a 13-second time delay setting to alert the control room personnel to the loss of control power to the feeder breaker for the safety related control valves.

In the response to this violation, the licensee stated that of the 696 safety related Agastat relays used in Units 2 and 3, 235 were tested due to regulatory requirements. A total of 461 relays were not in a preventive maintenance (PM) program. The licensee attributed this failure to an ineffective transfer of test requirements from the startup organization to the operating organization in 1982. The licensee recognized that this problem might exist and had initiated a task force to perform a 100% audit of the PM program. Similar deficiencies were identified in August 1988, prior to the NRC finding.

The licensee committed to complete the evaluation of the Agastat relay audit, retest them and include them in the appropriate PM program. Furthermore, the licensee planned to complete the ongoing audit of the PM program by September 1, 1989. This audit should identify other instances where appropriate PM had not been implemented.

The inspector considered the licensee's corrective actions to be responsive and this item is closed.

h. (Closed) Open Item (361/87-31-02) Reactor Trip on December 17, 1987 on Low SG Level

On December 17, 1987, the unit manually tripped upon a loss of feedwater to the steam generator. Main feedwater isolation valve (MFIV) 2HV-4048 failed closed when its solenoid valve failed open and dumped the fluid which was holding the MFIV open. The licensee found that the threaded conduit connection to the affected solenoid was loose, and the cable penetration area into the conduit connector was not sealed. Thus, water entered the solenoid housing and caused corrosion of the power lead and the terminal block. This resulted in failure of power to the solenoid.

The licensee inspected similar solenoids and revised maintenance procedure to prevent recurrence. This item is closed.

i. (Closed) Open Item (361/87-31-01) Compensatory Action Problem

During the previous inspection, a low temperature condition on battery 2D3 occurred. This was caused by an inoperable battery room ventilation system heater and the lack of proper compensatory actions. The inspector also noted that station's cold weather protection procedures warranted improvement with regard to batteries and other areas.

During this inspection, the inspector found that the licensee had evaluated the need for proper compensatory actions for cold weather protection. The following procedures were revised for all three units:

- SO1-12.9-11 (TCN 3-1) Miscellaneous Surveillance
- SO23-1-5 (TCN 5-23) Auxiliary Building Normal Heating, Ventilation, and Air Conditioning (HVAC) System Operation
- SO23-3-3.21 (TCN 12-20) Radiation Monitor Shiftly Surveillance

This item is closed.

j. (Closed) 362/88-31-01 (Open Item) Reactor Trip on Low SG Level

On January 6, 1989, Unit 3 tripped on low steam generator (SG) level. The low level was caused by a feedwater regulating valve which closed as a result of an electrical fault in the non-1E uninteruptible power supply.

This item is being tracked under the licensee event report associated with this event, therefore, this item is closed.

k. (Closed) 361/86-34-05 (Unresolved Item) Internal Wiring Deficiencies in Limitorque Valve Operators

Previous inspection reports discussed the identification by the licensee of EQ discrepancies associated with certain internal wiring in Limitorque valve operators.

Followup inspections have shown that appropriate corrective actions were taken by the licensee for the identified deficiencies. This item is closed.

l. (Closed) 361/85-19-01 (Open Item) Flow Testing Following Modifications to the Low Pressure Safety Injection (LPSI) System

Following piping modifications associated with the LPSI system, the inspector questioned whether the testing performed by the licensee satisfied the requirements in the Technical Specifications.

Followup review of this issue established that the modifications performed had not affected the balancing of flow among the different injection loops. This item is closed.

12. Exit Meeting (30703)

On February 15, 1989, 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.