U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-206/87-22, 50-361/87-20, 50-362/87-22

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: July 5 through August 22, 1987

Inspectors: for F. R. Huey, Senior Resident Inspector, Units 1, 2 and 3 — 9/10/87 Date Signed

for J. E. Tatum, Resident Inspector — 9/10/87 Date Signed

for A. L. Hon, Resident Inspector — 9/10/87 Date Signed

Approved By: P. H. Johnson, Chief
Reactor Projects Section 3 — 9/10/87 Date Signed

Inspection Summary

Inspection on July 5 through August 22, 1987 (Report Nos. 50-206/87-22, 50-361/87-20, 50-362/87-22)

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, independent inspection, licensee events report review, and follow-up of previously identified items. Inspection procedures 36700, 37701, 37702, 62700, 62704, 73051, 71707, 93702, 92700, 92701, 30703, 61726, 62703, and 71710 were covered.

Results: Of the areas examined, no violations or deviations were identified.

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DETAILS

1. Persons Contacted

Southern California Edison Company

H. Ray, Vice President, Site Manager
W. Moody, Deputy Site Manager
H. Morgan, Station Manager
M. Wharton, Assistant Technical 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
*W. Zintl, Compliance Manager
D. Peacor, Emergency Preparedness Manager
P. Eller, Security Manager
*W. Marsh, Operations Superintendent, Units 2/3
*J. Reeder, Operations Superintendent, Unit 1
V. Fisher, Assistant Operations Superintendent, Units 2/3
R. Joyce, Maintenance Manager, Units 2/3
L. Cash, Maintenance Manager, Unit 1
T. Mackey, Compliance Supervisor
C. Couser, Compliance Engineer

San Diego Gas & Electric Company

R. Erickson, San Diego Gas and Electric

*Denotes those attending the exit meeting on August 21, 1987.

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

The inspectors performed daily 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 safety equipment condition, housekeeping, examination for potential fire hazards, fluid leaks, excessive vibration, and verification that maintenance requests had been initiated for equipment in need of maintenance.

a. Main Steam Pressure Sensing Line Modification (Unit 1)

The inspector observed that a temporary sensing line was mounted on wood blocks which were attached to the guard rail near the main steam code safety valves. This was similar to a previous observation discussed in paragraph 10p of inspection report 50-206/87-03, in which wood blocks were used to support nitrogen bottles for the backup nitrogen system associated with the power operated relief valves. The licensee responded to the inspector's observations by tracing the temporary sensing line, and determined that it was connected to the main steam pressure sensing line. The licensee further determined that the temporary sensing line was not shown on current plant drawings and no one could remember the installation details. The licensee believed that the temporary sensing line was used at one time to facilitate calibration of the atmospheric steam dump and secondary code safety valve set points.

The main steam pressure sensing line to which the temporary sensing line was connected supplies steam pressure to instruments PT-2, PT-3459B and PT-459. PT-2 provides a pressure signal to the control room recorder, PT-3459B provides a pressure signal to the FOX computer in the technical support center, and PT-459 provides a pressure signal for compensation of the feedwater control system and the steam flow/feed flow mismatch reactor trip function. The inspector observed that failure of the temporary sensing line could result in the loss of these instruments.

The licensee documented the inspector's observation in nonconformance report (NCR) SO1-P-6206. The temporary sensing line was removed and the system was restored to the configuration indicated by the design documents. In addition, the licensee reminded plant operators of their responsibility to be cognizant of abnormal plant configurations and to report such configurations to plant management. The inspector observed that single failure of PT-459 was previously addressed by the licensee as documented in paragraph 9a of inspection report 50-206/87-10. The inspector also observed that main steam pressure indications are available for local manual operation of the atmospheric steam dump valves.

At the exit meeting, the inspector emphasized the importance of operator awareness to plant conditions, including plant configuration. No violations or deviations were identified.

b. Restraint of Temporary Equipment Near Safety Related Equipment for Seismic Protection (Unit 1)

The inspector observed that a portable battery charger was left unsecured near the battery cells in the number 2 battery room. The licensee took immediate actions to secure the charger and initiated a root cause evaluation to address the inspector's observation. The licensee determined that the battery charger was used to charge the spare battery cells in the number 2 battery room, and was subsequently left unsecured. Although the licensee believed that the existing housekeeping requirements were adequate to prevent this

condition from occurring, the licensee committed to take additional steps to enhance the existing program such as placing warning signs on temporary equipment and installing anchoring points at selected locations. In addition, disciplinary action was taken against the individual responsible for the deficient condition. Following the initial observation, the inspector observed steady improvement in the licensee's performance in this area and will continue to monitor program effectiveness.

c. Portable Two-Way Radio Usage in the Control Room (Unit 1)

During the annual emergency preparedness exercise on August 12, 1987, while the unit was at full power, the inspector observed that one of the exercise controllers was using a portable two-way radio in back of the control room near the technical support center (TSC) emergency HVAC control circuit. The inspector expressed concern to the control room supervisor, who promptly directed the user of the radio to move away from the control circuit. After the exercise, the inspector discussed the effects of electromagnetic interference on sensitive plant protection and control systems with the licensee. The licensee stated that the station policy and warning sign posted outside the control room prohibit two-way radio usage in the control room. Use of the radio during the exercise was allowed based on the distance between the locations of the radio and the main control board. However, this was a qualitative judgement without a detailed technical basis. The licensee committed at the exit meeting to prohibit radio transmission in the control room without exception.

d. Gas Binding of Component Cooling Water (CCW) Pump P-025 (Unit 3)

During this inspection period, on about July 28, the licensee identified that gas binding was occurring on CCW Pump P-025. The pump was declared inoperable pending completion of the licensee's evaluation (only two of the three pumps are required for plant operation). CCW P-025 is a swing pump which may be aligned to either train A or train B. The licensee observed that an excessive amount of gas was released while venting the pump. Subsequent analysis indicated that the gas was nitrogen. The suction head requirements for the CCW pump are satisfied by a component cooling water surge tank, which has a capacity of 6,320 gallons. The normal operating level of component cooling water in the surge tank is 5 to 9 feet, and the normal operating temperature is 125°F. Nitrogen is used to maintain a normal surge tank pressure of 40 psig. Each train of component cooling water has a surge tank, and the two trains are split during normal operation. The licensee believed that the split disk check valve on the discharge side of P-025 was leaking during periods when the pump was not in use. As the component cooling water leaks past the check valve, nitrogen escapes from solution and collects on the suction side of the pump. After the close of the inspection period, the licensee disassembled the split disk check valve and inspected it for damage. The results of the licensee's inspection will be reviewed during a future inspection. This is an

open item pending the licensee's final determination of the cause of nitrogen binding, and corrective actions (87-362/87-22-01).

e. Suction Pressure Fluctuations Associated with Charging Pump P-192 (Unit 3)

During plant operation in early August 1987, the licensee observed a loud banging noise on the suction side of charging pump 3P-192. During investigation, the licensee vented the suction piping and some gas was released. Upon completion of the venting process, the loud banging noise stopped, and no further recurrence of the noise was observed. The charging system is a safety grade system, which is required for depressurization and cooldown of the reactor plant via the pressurizer auxiliary spray system (San Onofre Units 2 and 3 do not have power operated relief valves to serve this function). The charging pumps normally take a suction from the volume control tank (VCT) but, during accident conditions, the charging pumps take a suction from the refueling water storage tanks. Normal operating temperature in the VCT is 120°F, and a hydrogen blanket maintains 15 to 50 psig pressure in the VCT. The licensee is currently evaluating the source of gas on the suction side of P-192. This is an open item pending resolution by the licensee (50-362/87-22-02).

f. Steam Driven Auxiliary Feedwater Pump 2P-140 Speed Control Deficiency (Unit 2)

While conducting surveillance testing on steam driven auxiliary feedwater pump 2P-140, the licensee observed that the turbine did not come up to normal operating speed and that the turbine speed was fluctuating. The steam turbine normally operates at 3,570 rpm and, during part load operating conditions, it operates at 1,133 rpm. During the surveillance testing, turbine speed was hunting and would not exceed 1,000 rpm. The licensee made adjustments to the governor control system to increase turbine speed, but the speed fluctuations could not be eliminated. The licensee subsequently removed the Woodward EG-M control box for evaluation by the vendor. A replacement control box was installed, and the surveillance was completed satisfactorily. This item is open pending resolution and corrective action by the licensee (50-361/87-20-01).

g. Coupling Failure on Charging Pump 2P-191 (Unit 2)

During this report period, the licensee identified that charging pump 2P-191 was not working properly. 2P-191 is a swing pump which may be aligned to either train A or train B. The charging pump is a horizontal, positive displacement, triplex plunger type manufactured by APV Gaulin. The licensee identified that the coupling which connects the drive motor to the pump drive shaft was slipping such that the pump shaft was not rotating. The coupling gear teeth were stripped to the point where slippage was occurring. The licensee replaced the worn coupling, and is currently evaluating the failure mechanism. This is an open item pending licensee resolution (50-361/87-20-02).

h. Safety Injection Tank (SIT) T-009 Level Inconsistencies (Unit 3)

On July 25, 1987, while Unit 3 was operating at 100% power, the licensee observed that the narrow range level indications for safety injection tank (SIT) T-009 disagreed by approximately 1.5%. A containment entry was made and the level transmitters were calibrated to correct the discrepancy. Following calibration, both narrow range level instruments indicated that the level in SIT T-009 was less than the minimum required by technical specification limiting condition for operation (LCO) 3.5.1, and that this condition may have existed longer than the one hour permitted by the LCO. The licensee reported this condition in LER 87-14, applicable to Unit 3, and restored SIT levels to the prescribed range within the time period allowed by the LCO. Additional information on the event is as presented in the LER. As part of the interim corrective actions, the licensee is recording all SIT level indications once per shift. The licensee has subsequently identified similar level discrepancies associated with SITs T-007 and T-010 on Unit 2, and SITs T-007, T-009, and T-010 on Unit 3. Several containment entries were made to calibrate the SIT level transmitters, but additional technical specification violations of LCO 3.5.1 did not occur. As stated in the licensee's LER, investigation into the cause of this condition is still in progress. This item is open pending root cause and corrective action determination by the licensee (50-362/87-22-03).

i. Housekeeping Program Improvements (Units 1, 2 and 3)

The licensee implemented a housekeeping inspection program in order to identify and document housekeeping deficiencies so that corrective actions could be taken. In the past, housekeeping deficiencies would occur due to failure of station personnel to adequately implement the established housekeeping requirements. The housekeeping inspection program appeared to be effective in identifying deficiencies, and in establishing and maintaining acceptable housekeeping conditions. The inspector observed that the housekeeping inspection program could be used by the licensee as an indicator of program implementation. For example, the housekeeping inspections provide indication of how well the area monitoring program is being implemented, how well station personnel are adhering to the housekeeping requirements, how well operations personnel are identifying housekeeping deficiencies, and how long deficiencies exist before they are corrected. The inspector discussed these observations with the licensee at the exit meeting.

No violations or deviations were identified.

3. Evaluation of Plant Trips and Events

Unit Runback Due To Partial Loss Of Circulating Water (Unit 1)

The inspector observed an unexpected unit runback on August 17, 1987, due to rapid loss of megawatt output and increased circulating water temperature differential. The operators responded to the transient and promptly identified an inadvertent opening of MOV-12, which allowed the discharged circulating water from the condenser to be recirculated. The plant system responded properly to the condition and was stabilized at 66% power after the operator closed MOV-12. The licensee conducted an incident investigation shortly after the event and determined that the most probable cause was an inadvertent manipulation of the control switch at the local control panel. Maintenance workers were working on the fish screen and, because of close proximity and similar appearance of the two switches, the licensee believes the switch for MOV-12 was operated instead of the switch for the fish screen. To preclude future recurrence, the licensee planned to improve labelling and provide additional separation for the switches. The licensee's planned corrective actions appeared to be appropriate.

No violations or deviations were identified.

4. Monthly Surveillance Activities

a. Unit 1

The inspector observed the following surveillances during this report period:

SO1-II-1.80	Containment Isolation Channel Test
SO1-12.3-2	Hot Operational Test of the Safety Injection and Containment Spray System
SO1-12.3-7	Monthly Sequencer Test

During the containment isolation channel test, while the sequencer was placed in "test" mode, the I&C technician removed the jumper cable connecting the containment isolation channel power supply to a voltage recorder. This was done to minimize inadvertent sequencer actuation. An apparent short circuit caused momentary power loss to the containment isolation channel which resulted in an actuation of the A-train containment isolation system (CIS). The operator verified that components of the system functioned properly and reset the CIS. The inspector verified that the licensee notified the NRC in accordance with 10 CFR 50.72 requirements.

b. Unit 2

The inspector observed calibration and testing of Westinghouse type CO Time-Overcurrent Relays which were conducted in accordance with procedure SO123-II-11.1 titled, "CO Relay Test/Calibration." The inspector observed that the surveillance was being done in accordance with the procedure and the equipment was cleared in

accordance with station requirements. In reviewing the procedure, the inspector made the following observations:

- The procedure was generic and was not written for a specific relay application; and it was not clear to the inspector which measuring and test equipment (M&TE) listed in the procedure was applicable to this specific relay. In addition, the maintenance order did not specifically identify the M&TE that was required to test the specific relay.

- One of the independent verification sign-offs was not completed prior to going on to the next step. The procedure did not make it clear if the independent verification was required prior to going to the next step, or if it was acceptable to go on to the next step and complete the independent verification at some later time.

The licensee acknowledged the inspector's observations and stated that enhancements would be made in these areas.

c. Unit 3

The inspector observed the following surveillance activities on Unit 3 during this report period:

SO23-II-9.123	Miscellaneous Temperature Devices Calibration The inspector observed calibration being conducted on temperature relays associated with diesel generator 3G-002. The surveillances were conducted in accordance with the procedure.
SO123-I-9.301	Battery-Spare Battery Cell Inspections, Charge and Capacity Test

No violations or deviations were identified.

5. Monthly Maintenance Activities

a. Unit 1

The inspector observed the following maintenance activities during this report period:

MO 87063047	Repair flange leak on valve FWS-CV-100B
MO 87081270	Troubleshooting south saltwater cooling pump G-13B discharge flow indication and alarm
MO 870704610	Troubleshooting spurious start of DG-1 when switched from lockout to standby

b. Wiring Deficiencies Associated with the Saltwater Cooling Pumps (Unit 2)

During this inspection period, the licensee identified that the motor enclosure strip heaters on the Unit 2 saltwater cooling pumps were not wired properly. The motor enclosure contains two strip heaters which should have been wired in series, but during initial installation they were wired so that one heater was bypassed. The licensee took immediate corrective actions to rewire the motor enclosure strip heaters for the proper configuration. The inspector observed that this activity was accomplished in accordance with the licensee's approved procedures. This item remains open pending root cause determination and resolution by the licensee (50-361/87-20-03).

c. Unit 3

During this report period, the inspector observed maintenance to verify water level in the cells associated with battery 3D-008 and conduct a single cell charge on cells 35, 49, and 52. This maintenance was conducted in accordance with procedure SO23-I.4.56 titled, "Maintenance Procedure for Single Cell Battery Charging."

No violations or deviations were identified.

6. Engineered Safety Feature Walkdown

Unit 1

The inspector verified containment integrity by utilizing procedure SO1-12.3-43 titled, "Containment Integrity Verification." The inspector observed that boric acid crystals and debris were accumulating in the containment sphere penetration doghouse area. Although the boric acid crystals contributed to adverse housekeeping conditions, they were not of sufficient size to indicate a significant leakage problem. This area is normally locked and seldom accessed. The licensee agreed with the inspector's observations and stated that the area was scheduled for cleaning as a result of a previous housekeeping inspection.

No violations or deviations were identified.

7. Independent Inspection

Containment Temperature Assessment (Units 1, 2 and 3)

The inspectors reviewed the design basis assumptions for containment temperature on Units 1, 2 and 3. The inspectors also reviewed technical specification requirements and temperature monitoring capabilities.

Unit 1

The containment temperature used as the environmental qualification (EQ) basis for Unit 1 is 108^{o}F; and for loss of coolant accident (LOCA), the design basis temperature is the calculated temperature profile described

in the safety analysis. Equipment lifetimes are adjusted in accordance with approved criteria for observed temperatures greater than 108°F. The current Unit 1 Technical Specifications do not include temperature limits for inside containment, but section 3.24 titled, "Fire Protection System Operability," does require compensatory monitoring of containment temperature if fire detection systems inside containment become inoperable.

Unit 1 containment temperatures are continuously recorded for the control rod drive mechanism shroud inlet and outlet, the reactor coolant pump motors, and the air space approximately 20' above the operating deck. The recorder is located in the 4KV room and there is no direct temperature readout in the control room. However, if any of the above temperatures exceed the setpoint, an annunciator will sound in the control room to alert the operators. During normal operation, the typical free air space temperature in containment varies from 107°F to 112°F. In order to validate the temperature assumptions used for the EQ program at other locations inside containment, the licensee placed celsistrips near the excess letdown and regenerative heat exchangers, the steam generators, the bioshield wall and the pressurizer relief valve areas to record the highest temperatures experienced throughout the year. The data will be evaluated by the licensee by mid-1988.

Units 2 and 3

The normal temperature inside containment for environmental qualification purposes is 120°F, and the design temperature for short-term post accident conditions is 300°F. This is documented in the licensee's Updated Final Safety Analysis Report (UFSAR) in table 3.11-1. Technical specification limiting condition for operation 3.6.1.5 requires primary containment average air temperature to be less than 120°F during modes 1, 2, 3 and 4. The surveillance requirement further stated that the average air temperature shall be the arithmetical average of any four temperatures taken at elevations 176', 68', 49 1/2', 34', and 19 1/2'. Based on these measurements, during the hottest months containment temperature is nominally 90°F with a maximum temperature of 140°F in the containment dome (elevation 176'). At least once per 24 hours, the licensee calculates the average air temperature to ensure that 120°F has not been exceeded. Containment temperature indication is provided in the control room on the plant monitoring system display and also on a strip chart recorder. In addition, annunciation is provided to alert the operators of abnormal containment temperatures.

No violations or deviations were identified.

8. Review of Licensee Event Reports

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

Unit 1

86-07-R1 Auxiliary Feedwater (AFW) Actuation and Main Steam PT Failure
86-15 Inadvertent Start of #2 Diesel Generator
86-16 Spurious Start of #1 Diesel Generator
86-17 Reactor Protection System (RPS) Actuation While Shutdown
87-07 Delinquent Boric Acid Storage Tank (BAST) Level Instrumentation Monthly Functional Test

87-08 Kapton Insulation Damage on Containment Penetration Cables

This item was previously discussed in paragraph 7c of inspection report 50-206/87-14. Additional followup of this item will be tracked by the open item number that was previously assigned (50-206/87-14-02).

87-09 Diesel Generator #1 Inadvertent Start
87-10 Containment Isolation System Actuation Due to Loose Power Supply Connection

Unit 2

82-06-X2 Stratified Boron in Refueling Water Storage Tank (RWST)
83-106 Surveillance Required for 125 VDC Battery Banks
83-112 Improper Number of Heat Sensors in Zones 12 and 42
83-130 Spurious Trip of Train B Emergency Chiller
83-146 Nitrogen Pressure In SIT Exceeded
86-18-R1 Trip Due to Failure of Control Rod Drive System
86-22-R1 Reactor Trip Following Main Steam Isolation Signal
87-06 Mispositioned Emergency Core Cooling System Valve Circuit Breakers
87-09 Failure to Establish Continuous Fire Watches

Unit 3

87-07 Containment Purge Monitor Missed Surveillance
87-13 HPSI Pump Bypass Valve Not Fully Closed
87-14 Safety Injection Tank Level Instrumentation

Additional discussion of this event is included in paragraph 2h of this report, and additional followup action on this item will be tracked by the open item number that was assigned (50-362/87-22-03).

No violations or deviations were identified.

9. Followup of Previously Identified Items

(Closed) Open Item (50-361/86-38-01), Safety Related Pump Bearing Oiler Empties When Pump Starts

During operation of an auxiliary feedwater pump, the automatic bearing oiler had emptied during pump operation. The licensee concluded that the

oiler was not required for normal operation and simply provides make-up oil for minor leaks. The inspector observed that the licensee currently has an oil monitoring program which frequently monitors oil consumption by safety-related equipment. The inspector also observed that the plant equipment operators inspect the automatic bearing oilers on a shiftly basis, and add oil as necessary. The bearing oilers hold approximately two ounces of oil. This item is closed.

No violations or deviations were identified.

10. Radiological Practices

The inspector periodically observed radiological protection practices to determine whether the licensee's program was being implemented in conformance with facility policies and procedures and in compliance with regulatory requirements. The inspector verified that health physics supervisors and professionals conducted frequent plant tours to observe activities in progress and were generally aware of significant plant activities, particularly those related to radiological conditions and/or challenges. ALARA consideration was given to each job that was performed during maintenance activities.

No violations or deviations were identified.

11. Physical Security

The inspector periodically observed security practices to ascertain that the licensee's implementation of the security plans was in accordance with site procedures. The inspector observed that the number of guards was adequate for the requirements of the security plan; that the search equipment at the access control points was operational; that the protected area barriers were well maintained without breaks; and that personnel allowed access to the protected area were badged and monitored and that monitoring equipment was functional. Night illumination inside the protected area was observed and obstructions were lighted adequately. Surveillance equipment was also observed during this inspection.

No violations or deviations were identified.

12. Exit Meeting

On August 21, 1987, an exit meeting was conducted with the licensee representatives identified in Paragraph 1. The inspectors summarized the inspection scope and findings as described in this report.