U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos:	50-275/92-35 and 50-323/92-35
Docket Nos:	50-275 and 50-323
License Nos:	DPR-80 and DPR-82
Licensee:	Pacific Gas and Electric Company Nuclear Power Generation, B14A 77 Beale Street, Room 1451 P. O. Box 770000 San Francisco, California 94177
Facility Name:	Diablo Canyon Units 1 and 2
Inspection at:	Diablo Canyon Site, San Luis Obispo County, California
Inspection Conducted:	December 22, 1992 through February 1, 1993
Inspectors:	M. Miller, Senior Resident Inspector B. Olson, Resident Inspector

Approved by: _____ 3-3-93
P. Johnson, Chief — Date Signed
Reactor Projects Section 1

Summary:

Inspection from December 22, 1992 through February 1, 1993 (Report Nos. 50-275/92-35 and 50-323/92-35)

Areas Inspected: The inspection included routine inspections of plant operations; maintenance and surveillance activities; followup of onsite events, open items, and licensee event reports (LERs); and selected independent inspection activities. Inspection Procedures 41701, 61726, 62703, 71707, 90712, 92700 and 93702 were used as guidance during this inspection.

Safety Issues Management System (SIMS) Items: None

Results

General Conclusions on Strengths and Weaknesses

Strengths:

The licensee's actions and analysis in response to the Unit 2 trip were prompt and appeared thorough (Paragraph 4.a).

No significant weakness were identified.

Significant Safety Matters:

None

Summary of Violations:

None

Open Items Summary:

No items were opened; 9 items were closed.

DETAILS

1. Persons Contacted

Pacific Gas and Electric Company

G. M. Rueger, Senior Vice President and General Manager, Nuclear Power Generation Business Unit
*J. D. Townsend, Vice President and Plant Manager, Diablo Canyon Operations
W. H. Fujimoto, Vice President, Nuclear Technical Services
*D. B. Miklush, Manager, Operations Services
*B. W. Giffin, Manager, Maintenance Services
*W. G. Crockett, Manager, Technical Services
J. E. Molden, Instrumentation and Controls Director
*R. P. Powers, Manager, Support Services
*T. L. Grebel, Regulatory Compliance Supervisor
J. S. Bard, Mechanical Maintenance Director
H. J. Phillips, Electrical Maintenance Director
J. A. Shoulders, Onsite Project Engineer
D. A. Taggart, Director, Quality Performance and Administration
S. R. Fridley, Operations Director
*T. A. Moulia, Assistant to Vice President, Diablo Canyon Operations
*M. R. Tresler, Project Engineer
*E. Carlsen, Engineer, Regulatory Compliance
*R. L. Thierry, Regulatory Compliance Senior Engineer
*C. R. Groff, Technical Services Assistant Manager
J. E. Fields, Lead Engineer, Quality Control
*W. T. Rapp, Onsite Safety Review Group Chairman
*M. Burgess, System Engineering Director
*R. L. Russell, Director, Nuclear Safety Assessment & Regulatory Affairs
*J. L. Portney, Systems Engineer, Systems Engineering
*J. H. Galle, Systems Engineer, Systems Engineering
*E. Chaloupka, Power Production Engineer, Plant Engineering
*P. M. Lang, Senior Quality Engineer, Quality Control
*R. W. Hess, Assistant Project Engineer, Onsite Project Engineering Group
*L. L. Cossette, Senior Power Production Engineer, Plant Engineering

*Denotes those attending the exit interview.

The inspectors also interviewed other licensee employees, including shift supervisors, shift foremen, reactor and auxiliary operators, maintenance personnel, plant technicians and engineers, and quality assurance personnel.

2. Operational Status of Diablo Canyon Units 1 and 2

Unit 1 operated at full power during this inspection period, except for a power reduction to 95% power on December 28 for about 6 hours to switch turbine governor valve control from valve 4 to valve 3.

Unit 2 reduced power to 50% on January 17, 1993 for condenser cleaning. The unit otherwise operated at full power until 9:30 PM on January 30, when a reactor trip was experienced as a result of a licensed operator's

failure to correctly block a turbine trip input during routine surveillance testing. This event is discussed in Paragraph 4.a. Unit 2 ended the inspection period in Mode 3, performing preparations for startup.

3. Operational Safety Verification (71707)

a. General

During the inspection period, the inspectors observed and examined activities to verify the operational safety of the licensee's facility. The observations and examinations of those activities were conducted on a daily, weekly or monthly basis.

On a daily basis, the inspectors observed control room activities to verify compliance with selected Limiting Conditions for Operation (LCOs) as prescribed in the facility Technical Specifications (TS). Logs, instrumentation, recorder traces, and other operational records were examined to obtain information on plant conditions and to evaluate trends. This operational information was then evaluated to determine whether regulatory requirements were satisfied. Shift turnovers were observed on a sampling basis to verify that all pertinent information on plant status was relayed to the oncoming crew. During each week, the inspectors toured accessible areas of the facility to observe the following:

(1) General plant and equipment conditions

(2) Fire hazards and fire fighting equipment

(3) Conduct of selected activities for compliance with the licensee's administrative controls and approved procedures

(4) Interiors of electrical and control panels

(5) Plant housekeeping and cleanliness

(6) Engineered safety features equipment alignment and conditions

(7) Storage of pressurized gas bottles

The inspectors talked with control room operators and other plant personnel. The discussions centered on pertinent topics of general plant conditions, procedures, security, training, and other aspects of the work activities.

b. Radiological Protection

The inspectors 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 inspectors verified that health physics supervisors and professionals conducted frequent plant tours to observe activities in progress and were aware of significant plant activities, particularly those related to

radiological conditions and/or challenges. ALARA considerations were found to be an integral part of each RWP (Radiation Work Permit).

c. Physical Security

Security activities were observed for conformance with regulatory requirements, implementation of the site security plan, and administrative procedures, including vehicle and personnel access screening, personnel badging, site security force manning, compensatory measures, and protected and vital area integrity. Exterior lighting was checked during backshift inspection.

No violations or deviations were identified.

4. Onsite Event Follow-up (93702)

a. Unit 2 Turbine Trip/Reactor Trip: On January 30, routine monthly surveillance testing of the main turbine resulted in a turbine trip and subsequent reactor trip. While performing a test of the "loss of condenser vacuum trip," the trip block lever was apparently not held in the correct position, resulting in the test signal actuating a turbine trip. The trip was uncomplicated, and the operations staff stabilized the plant in Mode 3. Following the trip, all automatic functions occurred as expected except that a condensate system heater drain pump failed to trip. A downstream flange gasket leaked, and a relatively mild water hammer occurred in a nearby condensate system vent line, possibly a result of the pump not tripping and therefore exposing the line to condenser vacuum.

Secondary Plant Transient Analysis: Based on recorded values of pressure instruments in the affected piping, and examination of piping supports, the licensee concluded that only minor pipe motion had occurred, and that the highest pressure experienced in the heater drain pump discharge piping near the failed gasket was about 700 psig, well below the 1500 psig design pressure. Therefore, the licensee concluded that no piping or instrument damage had occurred as a result of the water hammer.

Gasket Leak: The licensee cleaned and dried the equipment affected by the leaking gasket and replaced the gasket. Based on examination of the gasket, the licensee concluded that it had failed at an unexpectedly low pressure. The licensee stated that, to date, use of this flange type has not been identified in any safety related applications, nor have similar failures been identified. Root cause analysis is continuing.

Root Cause Of Turbine Trip: Licensee evaluation was continuing, focusing on the operator not having properly blocked the turbine trip test signal. This evaluation had not been completed as of the end of the inspection period, and will be followed by routine resident inspection efforts.

b. Inadvertent Letdown Isolation

On December 26, 1992, an inadvertent letdown isolation and pressurizer heater trip occurred in Unit 1 during the performance of a post-maintenance test on a pressurizer level controller. The letdown system and pressurizer heaters were returned to service within five minutes, thus having no effect on plant operation. The letdown isolation and pressurizer heater trip occurred after instrument and control technicians removed jumpers that were installed to allow performance of the test.

A subsequent investigation revealed that Loop Test 7-209A, "Pressurizer Level and Heater Control Channel LC-459C Calibration," did not specify a sequence for removing the jumpers. The Loop Test had specified a sequence for jumper installation in order to prevent a letdown isolation and pressurizer heater trip. The licensee initiated Quality Evaluation Q 0010308 to determine the root cause and corrective action to prevent recurrence. The inspectors verified that the letdown isolation function was not disabled during the time the jumpers were installed and will follow the results of the Quality Evaluation during routine resident inspection efforts.

c. Failure of Emergency Diesel Generator (EDG) Fuel Injector Snubber Valves

During testing between December 28 and December 30, 1992, the licensee experienced three separate failures of snubber valves in the fuel injection system of emergency diesel generator (EDG) 2-3. The snubber valves are part of the fuel injection pumps and act as hydraulic shock absorbers by dampening pulsations caused by the fuel injection pumps and by the closing of the fuel injectors. The snubber valves also act as a pressure boundary for the fuel injection system. The snubber valves developed radial cracks which resulted in fuel leaks and degraded performance of affected cylinders, but the operation of Unit 2 was not affected as EDG 2-3 had not yet been electrically connected to plant systems.

The failed snubber valves were manufactured by Lucas Bryce. The licensee determined that nine similar snubber valves were installed in EDG 2-2. On December 30, 1992, the licensee prepared a prompt operability assessment to evaluate the impact of the potentially defective snubber valves in EDG 2-2. Based on test data obtained from operation of EDG 2-3 with a failed snubber valve, the licensee concluded that EDG 2-2 could perform its safety function with the Lucas Bryce snubber valves installed. In addition, periodic testing of EDG 2-2 had revealed no indication of failed snubber valves. On January 7, 1993, the licensee replaced the nine Lucas Bryce snubber valves in EDG 2-2 with assemblies manufactured by American Bosch.

Nonconformance Report (NCR) DC2-92-EN-N033 was initiated as a result of the snubber valve failures. The licensee tested the failed snubber valves and found that the cracks appeared to have been a result of the heat treatment process used during manufacturing. In addition, the licensee learned from the diesel manufacturer, GE

Locomotives, that similar failures of Lucas Bryce snubber valves had been recently observed.

The inspectors reviewed the licensee's prompt operability assessment for EDG 2-2 and NCR DC2-92-EN-N033. The inspectors observed that the licensee acted in a timely manner to address this issue and was continuing to evaluate the failure of the snubber valves. Also, the licensee was evaluating the potential effect on fuel oil inventory if a EDG had to operate with failed snubber valves. The licensee initiated an INPO Network entry to document the failures, but determined that this event was not reportable under 10 CFR Part 21.

No violations or deviations were identified.

5. Maintenance (62703)

The inspectors observed portions of, and reviewed records on, selected maintenance activities to assure compliance with approved procedures, Technical Specifications, and appropriate industry codes and standards. Furthermore, the inspectors verified that maintenance activities were performed by qualified personnel, in accordance with fire protection and housekeeping controls, and that replacement parts were appropriately certified. These activities included:

- Work Order CO 104865, EDG 2-3, Post 200-Hour Endurance Run Inspection
- Work Order CO 109767, Remove EDG End Bell for Inspection
- Work Order CO 104613, Install Block Wall Modifications in 480 V Motor Switchgear Area
- Work Order CO 108802, EDG 2-2, Investigate/Repair Failure to Flash
- Work Order CO 109932, EDG 2-2, Correct Exhaust Leak, Cylinder Head 5-L
- Work Order CO 068939, Charger 2-2, Replace Gate/Filter Modules
- Work Order CO 109324, AFW Pump 1-1, Adjust Speed Control Governor

No violations or deviations were identified.

6. Testing of Diesel Generator 2-3 (62703)

During this inspection period, diesel generator 2-3 completed a 200-hour endurance test which was intended to resolve questions regarding the commercial grade dedication of the diesel generator. The inspectors observed portions of the endurance testing and informed Regional and Headquarters NRC personnel of the progress of testing. At the end of the inspection period, the licensee was performing post-test inspections of the diesel engine and the generator. NRC Inspection Report 50-275, 323/93-01 will address the results of the post test inspections.

No violations or deviations were identified.

7. Surveillance (61726)

By record review and direct observation of selected surveillance testing, the inspectors checked compliance with TS requirements and plant procedures. The inspectors verified that test equipment was calibrated, and that test results met acceptance criteria or were appropriately dispositioned. These tests included:

- STP M-16B, Operation of Train B Slave Relay K604 (Partial Test Performance)
- STP M-77, Safety and Relief Valve Testing
- STP P-6B, Routine Surveillance Test of Steam-Driven Auxiliary Feedwater Pump

No violations or deviations were identified.

8. Observation of Licensed Operator Training (41701)

On January 21, 1993, the inspector observed licensed operator training in the Simulator (Course LR 92, Lesson 925S2). The lesson involved a steam generator tube leak that developed into a steam generator tube rupture and included a degraded condition of startup power supplies. The Shift Technical Advisor and Control Room Assistant participated in this training session, and the Shift Supervisor practiced activating the Interim Site Emergency Organization in accordance with the Emergency Plan. Operator actions appeared appropriate and procedures were followed. The inspector also observed the licensee's critique of the simulator exercise, which appeared to provide appropriate feedback to both the operators and the training instructor.

No violations or deviations were identified.

9. Licensee Event Report (LER) Followup (92700, 90712)

The following LERs were reviewed and closed based on the licensee's root cause determination and corrective actions:

Unit 1:	92-21 Revision 0	Overtime Restrictions Exceeded
	92-16 Revision 0	Feedwater Snubber Failure
	92-23 Revision 0	Containment Fan Cooler Backdraft Damper Blade Cracking
	92-24 Revision 0	Failure to Meet Technical Specification Requirements for Increased Pump Surveillance Testing when Test Results Indicated Alert Range Values
	92-28 Revision 0	Malfunction of Fire Detection Computer

Unit 2:	86-26 Revision 1	Failure to Meet Technical Specification Action Statement for an Inoperable Auxiliary Feedwater Flow Transmitter
	92-03 Revision 0	Unit Shutdown Required Due to Inoperable High Pressure Turbine Stop Valve
	92-06 Revision 0	Failure to Meet Technical Specification Requirements for Fire Watches
	92-07 Revision 0	Vulnerability of Certain Limitorque Motor Operators to Declutch During a Seismic Event

No violations or deviations were identified.

10. Exit Meeting

An exit meeting was conducted on January 28, 1993, with the licensee representatives identified in Paragraph 1. The inspectors summarized the scope and findings of the inspection as described in this report.

The licensee did not identify as proprietary any of the materials reviewed by or discussed with the inspectors during this inspection.