

U. S. NUCLEAR REGULATORY COMMISSION
REGION V

Report Nos: 50-275/85-25 and 50-323/85-22

Docket Nos: 50-275 and 50-323

License Nos: DPR-80 and DPR-81

Licensee: Pacific Gas and Electric Company
77 Beale Street, Room 1451
San Francisco, California 94106

Facility Name: Diablo Canyon Units 1 and 2

Inspection at: Diablo Canyon Site, San Luis Obispo County, California

Inspection Conducted: May 26 - June 29, 1985

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| Inspectors: | <u><i>R. M. Mendonca</i></u> | <u>7/12/85</u> |
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| | J. F. Burdoin, Reactor Inspector | Date Signed |
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| | R. T. Dodds, Chief, Reactor Projects Section 1 | Date Signed |

Summary:

Inspection from May 26 through June 29, 1985 (Report Nos. 50-275/85-25 and 50-323/85-22)

Areas Inspected: Routine inspection of plant operations, maintenance and surveillance activities, followup of on-site events, open items, and LERs, as well as selected independent inspection activities.

This inspection effort required 209 inspector-hours for Unit 1, and 95 inspector-hours for Unit 2 by four resident inspectors and a regional based inspector.



DETAILS

1. Persons Contacted

- *R. C. Thornberry, Plant Manager
- R. Patterson, Assistant Plant Manager, Plant Superintendent
- *J. M. Gisclon, Assistant Plant Manager, Technical Services
- *W. B. Kaefer, Assistant Plant Manager, Support Services
- W. A. Wogsland, Technical Assistant to Nuclear Power Operations Manager
- *D. S. Taggart, Supervisor of Quality Assurance
- C. L. Eldridge, Quality Control Manager
- R. G. Todaro, Security Supervisor
- D. B. Miklush, Supervisor of Maintenance
- *J. A. Sexton, Supervisor of Operations
- *W. G. Crockett, Instrumentation and Control Maintenance Manager
- *T. W. Rapp, Onsite Safety Review Group Chairman
- R. L. Fisher, Senior Power Production Engineer
- *J. V. Boots, Supervisor of Chemistry and Radiation Protection
- W. B. McLane, Material and Project Coordination Manager
- L. F. Womack, Engineering Manager
- *T. J. Martin, Training Manager
- *T. L. Grebel, Regulatory Compliance Supervisor
- *R. S. Weinberg, News Service Representative

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

- * Denotes those attending the exit interview.

Note: Acronyms are used throughout this report; refer to the Index of Acronyms at the back of the report.

2. Operational Safety Verification

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 LCOs as prescribed in the facility TS. Logs, instrumentation, recorder traces, and other operational trends were reviewed for compliance with regulatory requirements. Shift turnovers were observed on a sample basis to verify that all pertinent information of plant status was relayed. During each week, the inspectors toured the accessible areas of the facility to observe the following:



- (1) General plant and equipment conditions.
- (2) Surveillance and maintenance activities.
- (3) Fire hazards and fire fighting equipment.
- (4) Radiation protection controls.
- (5) Conduct of selected activities for compliance with the licensee's administrative controls and approved procedures.
- (6) Interiors of electrical and control panels.
- (7) Implementation of selected portions of the licensee's physical security plan.
- (8) Plant housekeeping and cleanliness.

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

No violations or deviations were identified.

3. Event Followup

a. Snubber Damage

On June 6, 1985, the licensee identified a damaged hydraulic snubber on the steam supply pipe to the turbine driven AFW pump. The licensee's walkdown of the associated piping found another four damaged mechanical snubbers and one mechanical snubber that was termed "sticky." All of these damaged snubbers were on the two steam supply lines to the turbine driven auxiliary feedwater pump. The licensee inspected the steamlines for further damage including anchor bolts and found no significant damage. Based on the damaged snubbers, the licensee declared the turbine driven auxiliary feedwater pump inoperable, repaired the snubbers, tested the AFW turbine and associated lines, and declared the system operable, all in accordance with TS.

Included in this process was an engineering evaluation of the snubber damage. The licensee identified the cause of the snubber damage to be water-hammer which occurred as a consequence of a reactor trip/safety injection event on May 18, 1985 (IR 50-275/85-17 and LER 85-14). The water hammer was attributed to water accumulation in the steamline due to isolation of two associated steam traps. The licensee's evaluation of this event verified that the observed damage was probably caused by the attendant water hammer. The licensee also analyzed the AFW steam supply pipe configuration as found, and concluded that it would have withstood design bases seismic and thermal transients.



There is no evidence of when the steam traps were isolated; however, the licensee believes that the last potential for isolation of the steam traps was during main turbine performance testing. Test documentation indicates that the steam traps in question were isolated and returned to service for each of the three performed tests. The licensee had already planned to institute a steam trap functionality program which may help avoid such problems in the future.

The licensee plans to report this snubber damage in detail in a supplement to LER 85-14.

b. Inadvertant Start of a Diesel Generator

On June 13, 1985, DG 1-2 inadvertently started during surveillance testing. The test was intended to start DG 1-3 from the Unit 2 startup bus undervoltage relay. However, the auxiliary operator went to Unit 1 instead of the Unit 2 "out of habit", and selected the wrong bus. (Another recent event, that involved wrong unit maintenance, caused a power transient, see IR 85-17).

Licensee management has directed extensive attention to these occurrences. On June 14, 1985, the Vice President for Nuclear Power Generation conducted a critique of these events with plant personnel. Corrective actions included a memo to SFM requiring use of a "military style" of communication when giving operating instructions over the phone or in person, i.e. , "the recipient of the message repeats the instruction back to the other person to verify the message was properly understood." Additionally, specific labeling of doors and equipment with a unit designation is underway. Plant management is considering other changes to provide additional assurance for correct implementation of operating activities, e.g., color coding of paper, equipment, and personnel identification (hardhats), and specific assignment to one unit. Also, a Plant Performance Improvement Advisory Group has been recently formed to provide additional working level input to plant improvements. The wrong unit problem is a high priority for this group. Finally, the plant is also surveying PG&E organizations outside the plant for techniques they have developed to address similar problems.

The licensee plans to provide an LER on this event, to discuss their program to avoid wrong unit operations in the future. The inspector observed the TRG meeting on this event. The inspector observed that the involved individual was not in attendance and that although the TRG's resolutions were acceptable some questions could have been better answered by the involved individual (see section on TRG assessment). However, management action and involvement in this area appeared to be appropriate to control and avoid the wrong unit problem in the future.



c. Axial Flux Difference Outside Target Band

On June 18, 1985, Unit 1 reactor power was raised from 50% to 100% by the control operator. Reactor power continued to increase to 103% due to xenon burnout. Also, T AVG reached 585 degrees F and axial flux difference exceeded the +/- 5% target band. The CO took immediate actions to reduce power and return axial flux difference to the target band. While the CO attempted to terminate the power increase, the axial flux difference remained outside the target band for 17.1 minutes with reactor power above 90%.

The licensee felt the administrative guidelines for changing plant load allowed for too rapid a load increase and immediately reduced the maximum administrative limit for load changes from 10 MW/MIN to 5 MW/MIN. Additionally, licensee management has identified the need to assure that reactor operators have adequate support from senior licensed operators during key plant evolutions. Licensee management's discussion with the involved operator concluded that the operator had been in training for an extended period of time, and had only recently returned to shift. The licensee has committed to provide additional instructions to senior licensed personnel (SFM and SCO's) to assure "adequate supervision" for personnel who have not had recent experience with a specific evolution.

The commitment to provide "adequate supervision" was obtained from the Plant Superintendent based on his involvement in this issue. The inspector observed the TRG that resolved this issue and this supervision question was not addressed (see section on TRG). Plant management believes the TRG acted appropriately in this instance.

The licensee plans to issue an LER on this event.

No violations or deviations were identified.

4. Maintenance

The inspectors observed portions of, and reviewed records on, maintenance activities to assure compliance to approved procedures, technical specifications, and appropriate industry codes and standards.

a. Replacement of Instrument Inverters

On May 18, 1985, Unit 1 experienced a reactor trip and safety injection resulting from failure of a transformer in instrument AC power inverter IY-13 (see IR 50-275/85-17). This inverter was designed with two transformers in parallel, which established a cross current which could cause transformer burnout. To correct this design problem, the licensee purchased transformers from Marble Hill, which have a single transformer. The inspector pointed out, to the licensee, the generic problems with these new type of ferro-resonant transformers in accordance with IE Information Notice No. 84-84 and Revision 1 to this Notice. The licensee responded by assuring that these transformers will operate correctly by high potting the transformers in accordance with the IE Information



Notices (pull tests on capacitor connections were not required, since the licensee solders these connections).

Additionally, the inspectors observed portions of the removal and installation process for the Unit 2 inverters, as well as the testing and return to service of selected inverters.

b. 480 Volt Vital Bus Maintenance

The inspector observed portions of electrical maintenance performed on Unit 2 480 volt vital bus 2F. This maintenance consisted in part of 480 volt "line starter" maintenance, breaker replacement, and post-replacement maintenance testing. The clearances and SWFs reviewed were properly followed with one minor exception of a QC hold point which was initialed as not applicable by the QC inspector but not dated. This discrepancy was not found by the licensee although the maintenance supervisor and final QC reviews had been performed. The licensee re-reviewed the SWF and corrected this discrepancy.

c. Steam Generator Blowdown Tank Relief Valve

The inspector observed portions of the mechanical maintenance on the subject, Unit 2 valve, MS-2-RV-25. The work consisted of disassembly, lapping and reassembly of the relief valve. The work was conducted in response to NPPR DC1-85-WP-P0085 and associated maintenance procedures. The mechanic performing the activity understood the extent of the work and associated administrative controls.

No violations or deviations were identified.

5. Surveillance

By direct observation and record review of licensee surveillance testing, the inspectors verified compliance with TS requirements and implementing plant procedures for the following items:

a. Total Particulate Contaminant of Diesel Fuel Oil

The inspector observed portions of the licensee's subject surveillance, performed in accordance with Chemistry Analysis Procedure C-71. The technician understood the procedure and used appropriately calibrated equipment. The results were reviewed and accepted by a Chem and Rad Protection Engineer.

b. Diesel Engine Generator 1-3 Routine Functional Test

The inspector observed selected portions of the subject STP, M-9 A. DG 1-3 was started, acceptably accelerated to speed, and achieved rated voltage. Operations department personnel understood the testing procedure, and performed the tests in accordance with the procedure. Data was acceptably recorded and reviewed.



c. Diesel Fuel Flash Test

The inspector observed the subject Chemical Analysis Procedure C-70 testing for compliance to Unit 2 Technical Specifications. The test was conducted in accordance with the procedure. Equipment used for the test was appropriately calibrated and used. The technicians were also knowledgeable of the test purpose and safety precautions. The technicians measured the diesel fuel flash point as being within the acceptance criteria.

No violations or deviations were identified.

6. Independent Inspection

a. Location of the Manual Trip Circuit in the Solid State Protection System

NRC TI 2500/14 inspection guidance required verification of correct drawings and configuration of the manual trip circuit to the SSPS. The inspector reviewed drawing numbers 437610 and 663231-161-1 to assure that the controlled drawings match the configuration required by design and the TI (that is, the manual trip was downstream of specific SSPS output transistors). Further, the inspector verified, by observation of SSPS configuration, that the SSPS card in question was in the correct position in relation to the manual trip circuit. The subject TI is considered closed.

b. Substance Abuse Program

The licensee's program for detection of substance (drug) abuse includes a site-specific training program (covered in IR 50-275/85-23), supervisor observations, and a company-wide, new employee screening program. A revised training manual is planned to be out by August 1985. Supervisors are trained to observe and question unusual behavior or appearance. With a reasonable suspicion, an individual can be asked to undergo a physician's evaluation. The individual can also be offered or volunteer for assistance based on these observations and evaluations, as well as, be subject to disciplinary action. The previously mentioned screening program currently consists of urinalysis of prospective employees.

c. Assessment of Technical Review Groups

Several TRG meetings were observed during the inspection period to evaluate the licensee's problem resolution techniques. Two of the TRGs documented in this report, may not have been as effective as the majority of meetings observed by the inspectors. The TRG concerning an inadvertent start of DG 1-2 (Section 3.b of this report) could have been expedited had the individual involved attended the meeting; also the TRG on exceeding axial flux difference could have been more thorough if the event (described in section 3.c of this report) had been discussed with the individual directly involved. In both cases, prompt plant management attention



ensured final resolutions and was considered to be thorough and timely; however, in view of the above, it may be appropriate for plant management to consider an independent evaluation of TRG effectiveness (Followup Item 50-275/85-25-01).

No violations or deviations were identified.

7. Open Items Followup

a. (Closed) Items 50-275/85-14-01 and 50-323/85-02-01 Environmental Qualification of the T.C. Reference Junction Boxes and Connectors

The above inspection reports, dated April 4, 1985, identified that tests to verify the environmental qualification for the core exit thermocouples system reference junction boxes and connectors were not successful.

The licensee believes that the problems experienced by Westinghouse are partly the result of design, but largely due to an attempt to qualify the components to generic environmental conditions more stringent than those required to meet the Diablo Canyon plant specific design requirements. The licensee's letter, DCL-85-111 of March 13, 1985, identified that during an external pressurization test, the core exit thermocouple system reference junction box proved not to be leaktight, and would allow steam to enter the box during a Loss of Coolant Accident test. To correct this deficiency, the licensee re-designed and modified the cover for the box and stiffened the box mounting members. It was concluded by the licensee, that based on their design modifications to the reference junction box and connectors, the equipment will perform its intended safety functions under the plant-specific environmental conditions. The licensee's letter, DCL-85-068 of February 15, 1985, identified that the licensee had contracted with an outside testing laboratory to conduct environmental testing and qualification of the reference junction box and connectors, to meet Diablo Canyon Power Plant Units 1 and 2 specific conditions.

The licensee's letter, DCL-85-143 of April 8, 1985, stated that the testing of the core exit thermocouples system reference junction box and connectors had been successfully completed and the equipment is qualified. The NRC NRR staff is in the process of evaluating the test results for this test.

The inspector reviewed the design for the modifications to the core exit thermocouples system reference junction boxes as portrayed on DCN's DCI-EC-31073 (work request ED-192) and DC2-EC-32023 (work request 6418) for Units 1 and 2 respectively. The modifications to the two reference junction boxes in Unit 2 containment were inspected in the field and found to conform to the design as depicted on DCN DC2-EC-32023. The documentation for the completion of the two work requests, and QC records for the inspections of the modifications, were examined and appeared to be in order.

This item is closed for Units 1 and 2.



b. (Closed) Item 50-323/85-02-02 Water Hammer Phenomenon in Auxiliary Saltwater System

The above referenced inspection report dated April 4, 1985, identified that the licensee had initiated a modification to Unit 2 ASW vacuum breakers to raise the vent pipes above the maximum flood elevation of the valve pit.

The modifications to the two vacuum breakers/vent pipes were completed during late April 1985 under MVR M-5167 and work request BM-720. The completed modifications to the two ASW vacuum breaker systems for Unit 2 were inspected in the field. The inspector also examined in detail the MVR, work request and QC documentation for the modifications. The modifications are completed and all the documentation appears to be in proper order.

The inspector examined the valve pit where the Unit 1 ASW vacuum breaker systems were located to be assured that the same error had not been made during initial installation of these systems. The vent pipes were found to be located above the valve pit overflow drain opening, which is the correct installation.

This item is closed.

No violations or deviations were identified.

8. Licensee Event Report Follow-up (Unit 1)

LERs 85-13 through 85-16 were examined in NRC IR number 50-275/85-17. The licensee's review of these LERs and reporting to NRC within required time intervals were verified by the inspectors. The inspectors also ensured appropriate corrective actions were established and applicable events were accurately described. Accordingly, these LERs are considered closed.

No violations or deviations were identified.

9. Non-Compliance Followup (Unit 1)

NRC IR Number 50-275/85-17 contained a Notice of Violation issued to the licensee as the result of the licensee entering Mode 4 of reactor operation with only two diesel generators operable, contrary to the requirements of TS 3.8.1.1 and 3.0.4. The required licensee response to this Notice was submitted to the NRC in PG&G letter number DCL-85-230, dated June 27, 1985, within the specified 20 day time period. The licensee has revised STP M-13B to assure a DG is declared inoperable when associated load sequence timers are found to be out of specification limits. Additionally, appropriate personnel have received training on this issue. All STPs were also reviewed for similar situations. Required revisions to these STPs are scheduled to be completed by August 1, 1985. The inspector will follow progress on this issue under the normal inspection program. Open item 50-275/85-17-01 is considered closed.



No violations or deviations were identified.

10. IE Bulletin Followup

(Closed IEB 81-01 for Unit 2) Inspection of Mechanical Snubbers

The inspector examined the licensee's program and records pertaining to the inspection of mechanical snubbers. The inspection was performed pursuant to temporary procedure TD-8402, "Visual Inspection of Mechanical Snubbers". The procedure required a visual inspection and stroke test of all safety-related snubbers. Appropriate precautions were included in the procedure. The inspection was started on February 14, 1985 and completed April 26, 1985. The work was performed under Shop Follower MM-2-84-153. The findings resulted in 22 snubbers with impaired operability. It appeared that all identified deficiencies were related to construction activities and not the result of manufacturer or design deficiencies. Nuclear Plant Problems Reports were issued for the repair/replacement of identified problems. The licensee has formally transmitted the results of the inspection to the NRC via PG and E letter number DCL-85-195 dated May 28, 1985 (Closed IEB-81-01).

No violations or deficiencies were identified.

11. Exit

An exit meeting was held with the licensee's representatives identified in paragraph 1 on June 28, 1985, wherein the inspectors summarized the scope and findings of the inspection as described in this report.

An event of generic management interest occurred when a diesel generator inadvertently started due to an operator going to the wrong unit out of habit. Management attention to this event has been appropriate and followup is recommended.



Index of Acronyms

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| AFR | Audit Finding Report |
| ANS | American Nuclear Society |
| ANSI | American National Standards Institute |
| ASME | American Society of Mechanical Engineers |
| AFW | Auxiliary Feedwater |
| ASW | Auxiliary Saltwater |
| BA | Boric Acid |
| C&RP | Chemistry and Radiation Protection |
| CFCU | Containment Fan Cooler Unit |
| CFR | Code of Federal Regulations |
| CO | Control Operator |
| CRVS | Control Room Ventilation System |
| CVCS | Chemical and Volume Control System |
| DCN | Design Change Notice |
| DEH | Digital Electro-Hydraulic |
| DER | Department of Engineering Research |
| DG | Diesel Generator |
| DR | Discrepancy Report |
| ECP | Estimated Critical Position |
| EOF | Emergency Offsite Facility |
| ESF | Engineered Safety Features |
| FEMA | Federal Emergency Management Agency |
| FHB | Fuel Handling Building |
| FCV | Flow Control Valve |
| FSAR | Final Safety Analysis Report |
| GAP | Government Accountability Project |
| GC | General Construction |
| GDT | Gas Decay Tank |
| GONPRAC | General Office Nuclear Plant Review and Audit Committee |
| HFT | Hot Functional Test |
| I&C | Instrumentation and Control |
| IE | Inspection and Enforcement |
| INPO | Institute of Nuclear Power Operations |
| IR | Inspection Report |
| ISI | Inservice Inspection |
| LER | Licensee Event Report |
| CO | Limiting Conditions for Operation |
| LCV | Level Control Valve |
| LHUT | Liquid Holdup Tank |
| LLNL | Lawrence Livermore National Laboratory |
| LT | Level Transmitter |
| MCL | Master Completion List |
| MIDS | Moveable Incore Detector System |
| MM | Mechanical Maintenance |
| MP | Maintenance Procedure |
| MT | Magnetic Particle Test |
| MVR | Minor Variation Report |
| NDE | Nondestructive Examination |
| NED | Nuclear Engineering Department |
| NOV | Notice of Violation |
| NPAP | Nuclear Plant Administrative Procedure |



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| NPO | Nuclear Power Operations |
| NPPR | Nuclear Plant Problem Report |
| NRC | Nuclear Regulatory Commission |
| NRR | Nuclear Reactor Regulation |
| NSSS | Nuclear Steam Supply System |
| OIR | Open Item Report |
| OP | Operating Procedure |
| OPEG | Onsite Plant Engineering Group |
| OSRG | Onsite Review Group |
| PCV | Pressure Control Valve |
| PN | Preliminary Notification |
| PASS | Post Accident Sampling System |
| PG&E | Pacific Gas and Electric |
| PORV | Power Operated Refllief Valve |
| PRT | Pressurizer Relief Tank |
| PSRC | Plant Staff Review Committee |
| PSI | Preservice Inspection |
| PWR | Pressurized Water Reactor |
| QA | Quality Assurance |
| QAM | Quality Assurance Manual |
| QAP | Quality Assurance Procedure |
| QC | Quality Control |
| QCSR | Qaulity Concern Summary Report |
| QCI | Qaulity Control Instruction |
| RCA | Radiological Controlled Area |
| RCCA | Rod Control Cluster Assembly |
| RBP | Radiation Base Point |
| RCP | Reactor Coolant Pump |
| RCS | Reactor Coolant System |
| RHR | Residual Heat Removal |
| RM | Radiation Monitor |
| RO | Reactor Operator |
| RVLIS | Reactor Vessel Level Indications System |
| RWP | Routine Work Permit |
| SCO | Senior Control Operator |
| SFM | Shift Foreman |
| SI | Safety Injection |
| SOER | Significant Operating Experience Report |
| SPDS | Safety Paramenter Display System |
| SRO | Senior Reactor Operators |
| SSER | Supplemental Safety Evaluation Report |
| SSPS | Solid State Protection System |
| STP | Surveillance Test Procedure |
| S/U | Start-up |
| SWP | Special Work Permit |
| SWF | Shopwork Follower |
| TI | Temporary Instruction |
| TMI | Three Mile Island |
| TRG | Technical Review Group |
| TS | Technical Specifications |
| USNRC | United States Nuclear Regulatory Commission |
| UV | Under Voltage |
| WGS | Waste Gas System |

