

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-275/85-36, 50-323/85-34  
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: San Luis Obispo County, California  
Inspection conducted: November 18 - December 12, 1985

Inspectors: Albert Young Jr. for 12/24/85  
P. Qualls, Reactor Inspector Date Signed  
Peter H. Phelan 12/23/85  
P. Phelan, Reactor Inspector Date Signed

Approved By: Albert Young Jr. 12/24/85  
T. Young, Jr., Chief, Engineering Section Date Signed

Summary:

Inspection conducted November 18 - December 12, 1985 (Report Nos. 50-275/85-36 and 50-323/85-34)

Areas Inspected: Announced inspection by a six member team consisting of two region based NRC inspectors, two NRR system reviewers and two consultants from Brookhaven National Laboratory of the licensee's compliance with 10 CFR 50 Appendix R Sections III G, J, O, and L. The inspection used Manual Chapters 30703 and TI 2515/62 Rev. 2. The inspection onsite consisted of total of 211 hours by the inspection team.

Results: No violations or deviations were identified. One unresolved item (see paragraph 3.a(5)) was identified.

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## DETAILS

### 1. Persons Contacted

- \*G. Moore, PG&E, Manager, NECS
- \*J. Gibbs, PG&E, Architectural
- \*R. Johnson, NRA Onsite Licensing
- \*R. Taylor, PG&E QS
- \*M. Smith, PG&E Power Production Engineer
- \*\*F. Chan, PG&E Electrical Engineer
- \*P. Nicholson, EPM, Fire Protection Engineer
- \*\*J. Shoulders, M&NE
- \*R. Kohout, PG&E, Station Emergency Services Supervisor
- \*\*B. Lee, PG&E, Licensing
- \*\*R. Panero, PG&E, Corporate Fire Protection Engineer
- \*T. Grebel, PG&E, Regulatory Compliance
- \*J. Gisclon, PG&E, Assistant Plant Manager
- \*J. Diamonon, PG&E, Senior Power Production Engineer
- \*R. Fisher, PG&E, Senior Operations Engineer
- \*C. Lewis, Impell, Fire Protection Engineer
- \*P. Hypmar, PG&E, Engineering Supervisor
- \*P. Kau, PG&E, Lead Senior Engineer
- \*\*E. Connell, PG&E, Supervisor
- \*\*B. Oman, PG&E, Supervisor
- J. Bard, PG&E, Shift Foreman
- M. Abromovite, PG&E, STA
- M. Johnston, PG&E, Auxiliary Operator
- R. Hamilton, PG&E, Auxiliary Operator
- J. Lyle, PG&E, Assistant Control Operator
- A. Mosqueda, PG&E, Control Operator
- M. Price, PG&E, Senior Control Room Operator
- T. Lee, PG&E, Nuclear Engineering Group Leader
- T. Pelliscro, PG&E, Operations Engineer

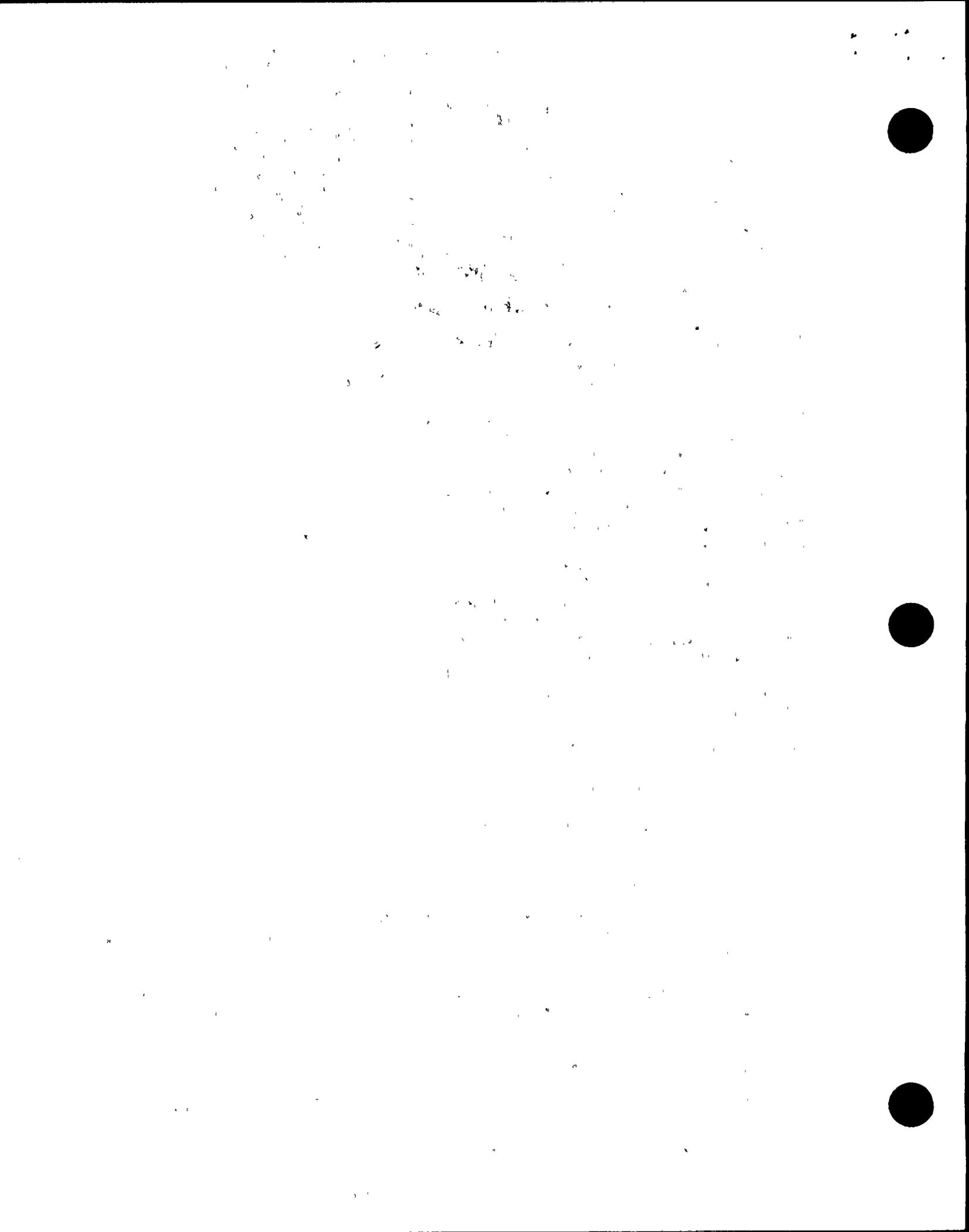
\*Denotes personnel at Exit Meeting.

\*\*Denotes personnel contacted in telephone call on December 12, 1985.

In addition, numerous other members of licensee staff were contacted throughout the course of the inspection.

### 2. Documents Reviewed

- o PG&E letter and enclosure of December 6, 1984, DCL-84-374, "Diablo Canyon Unit 2 Review of 10 CFR 50 Appendix R, Sections III.G, III.J, and III.O, Rev. 1.
- o PG&E letter and enclosure dated July 15, 1983, "Diablo Canyon Unit 1 Review of 10 CFR 50 Appendix R, Sections III.G, III.J and III.O."
- o Diablo Canyon Procedure OP AP-8, "Control Room Inaccessibility Procedures", Revision 3.
- o Diablo Canyon Units 1 and 2 License and Technical Specifications.



- Diablo Canyon Drawings Showing Fire Area Designations.
- Diablo Canyon Drawings for the RCP Lube Oil Collection System.
- Diablo Canyon Drawings for the Emergency Lighting System.
- Diablo Canyon Electrical Drawings Showing Systems and Circuits Required for Safe Shutdown.

A. REFERENCE DRAWINGS

<u>Title</u>	<u>Drawing No.</u>	<u>Revision</u>
- Auxiliary Feedwater Motor Operated Valves	437507	15
- Auxiliary Feedwater Pumps	437583	15
- Auxiliary Feedwater Pump Turbine Control	437584	12
- Safety Injection System-Motor Operated Valves	437606	10
- Volume Control System-Motor Operated Valves	437607	9
- Steam Dump Solenoid Valves	437648	8
- Diesel Fuel Transfer Pumps	437657	7
- Main Steam Isolation Valves	437679	7
- Chemical and Volume Control System-Solenoid Valves	437682	11
- Steam Generator-Blow Down Solenoid Valves	437685	5
- Single Line Meter & Relay 4160V System	441219	3A
- Single Line Meter & Relay 4160V System SH 2 Bus "F"	441229	6
- Single Line Meter & Relay Diagram 120V Instrument HE System	445290	2
- Turbine Driven Auxiliary Steam Valve	455060	2

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B. INSTRUMENT SCHEMATICS

<u>Title</u>	<u>Drawing No.</u>	<u>Revision</u>
- FCV152, FCV-15, FCV95 Steam Supply Valves for AF1H Pump 2-1	102032	16
- 8149, A,B,C - CVCS-Orifice Isolation Valves	102032	17
- FCV 41, FCV 42, FCV 43, FCV 44 Main Steam Isolation Valves	102032-	25
- TI 406 - RCS - T <sub>hot</sub> and T <sub>cold</sub>	102035-SHT60	21
- LI 526, 536, 546	102036-SHT10	21
- LCV-107&108, LCV-110&111, LCV-113&115 Steam Generator Level Control Valve	102036-SHT8	21
- PCV-19, PCV-20, PCV-21, PCV-22 10% Steam Dumps	102036-SHT16	16
- LI 406 - Pressurizer Level	102036-SHT23	26
- FCV128 - Charging Pump Discharge Head Valve	102036-SHT30A	16

C. PIPING SCHEMATICS

<u>Title</u>	<u>Drawing No.</u>	<u>Revision</u>
- Chemical & Volume Control System	108008	3
- Safety Injection System	108009	5
- Residual Heat Removal System	108010	4
- Containment Spray System	108012	3
- Component Cooling System	108014	2
- Salt Water Systems	108017	5

In addition, a number of drawings, logs, procedure and PG&E analyses not listed were used by the team during the course of the inspection.

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3. Facility Design - 10 CFR 50 Appendix R Compliance

As a condition of licensing, Diablo Canyon is required to meet the requirements of 10 CFR 50 Appendix R Sections III.G, J, O, and L. The Appendix R criteria specified, requires that the fire protection features provided in the facility's design be capable of limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or remote shutdown station be free of fire damage. Systems necessary to achieve and maintain cold shutdown conditions are required to be repairable in order to achieve cold shutdown within 72 hours from either the control room or remote shutdown station.

A collective assessment of selected areas containing structures, systems and components important to safe shutdown was made by the inspection team as discussed below.

a. Compliance with Section III.G.2 and III.G.3

Systems necessary to achieve and maintain hot shutdown conditions were examined for physical separation of equipment, associated circuits and protection from fire damage. The following criteria were used during the inspectors review.

- ° Three hour rated fire barriers were installed between redundant safe shutdown trains.
- ° A one hour rated fire barrier was installed around one safe shutdown train and automatic fire detection and suppression was installed in the fire area.
- ° A minimum of 20 foot horizontal separation, with no intervening combustibles was provided between redundant trains and automatic fire detection and suppression was installed in the fire area.
- ° Alternative shutdown capability was provided for the control room where it was not practical to utilize the methods discussed above.
- ° Deviations approved by the NRC for certain plant areas with low fire potential and adequate separation to withstand the effects of a postulated fire were obtained.
- ° Interim compensatory measures were taken while modifications are being performed to improve the fire integrity of certain existing fire barriers which were of concern to the NRC.

In general, the areas, systems and associated circuits examined were provided with adequate fire protection features to mitigate the affects of fire throughout the facility. The following areas where the plant did not conform to Appendix R requirements were identified by the licensee to the inspection team at the entrance meeting.

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(1) Structural Steel in Fire Barriers

Section III.G.2.a. of Appendix R to 10 CFR 50 stipulates that redundant shutdown-related systems should be separated by a fire barrier having a three-hour fire-rating. Structural steel forming a part of or supporting such barriers should be protected to provide fire resistance equivalent to that of the barrier. The licensee identified to the inspection team a number of fire areas, such as fire areas 13-F, 12-E and 10 where a three hour barrier is required to separate redundant safe shutdown trains and where the steel was not analyzed to determine if protection would be required. The licensee had already initiated a program to analyze the fire loadings and steel in these areas to determine if protection is required and to protect the steel where necessary.

Licensee Technical Specification 3/4.7.10 states, in part, "with one or more...fire barrier penetrations non-functional, within one hour...verify the OPERABILITY of fire detectors on at least one side of the non-functional fire barrier and establish an hourly fire watch patrol."

Although, as discussed in paragraph 3.a.(3), fire detectors were not in all cases installed according to the NFPA code, the licensee did have the minimum to declare OPERABILITY as defined by Technical Specification 3.3.3.8. In addition, the licensee has in effect an hourly fire tour throughout all accessible vital areas of the facility since licensing Unit 1. This is an open item pending licensee analysis and corrective action if required (50-275/85-36-01).

(2) Bus Duct Penetrations

In the facility are a number of unprotected bus duct penetrations that penetrate barriers separating redundant trains of safe shutdown equipment. The licensee identified these to the inspection team at the entrance meeting. The licensee had initiated work to inspect and protect the bus duct penetrations, when the plant is able to deenergize the bus inside the duct so that the work may be performed safely. In addition, the licensee met the Technical Specification requirements listed in paragraph 3.a(1) above. This item is open pending licensee completion of corrective actions if required (50-275/85-36-02).

(3) Fire Detectors

By letter dated July 27, 1977, the licensee committed to install fire detection systems in the plant in accordance with the provisions of NFPA Standard No. 72D. The licensee identified to the team that fire detectors were not installed in complete accordance with the code throughout some plant areas such as in the cable spreading rooms on elevation 104 feet.

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The licensee had proper corrective measures initiated.

Technical Specification 3.3.3.8 also states, in part, "with the number of fire detection instruments less than the minimum instruments operable requirement...within one hour establish a fire watch patrol to inspect the zones...at least once per hour."

As discussed in paragraph 3.a(1), the licensee had the proper hourly fire watch patrols established throughout both plants.

This is an open item pending completion of licensee corrective actions (50-275/85-36-03).

(4) Fire Suppression

The licensee identified that in the turbine driven auxiliary feed pump room in Unit 2, the sprinkler system was not installed in complete accordance with NFPA Standard 13. A missile shield had been installed above the turbine which blocked the water spray path. The licensee had identified this discrepancy and initiated corrective action. In this area all redundant safe shutdown equipment was separated from each other by a fire barrier so no redundant equipment could be damaged.

Technical Specification 3.7.9.2 states, in part:

"a. With one or more of the required Spray and/or Sprinkler Systems inoperable, within one hour, establish a continuous fire watch with backup fire suppression equipment for those areas in which redundant systems or components could be damaged; for other areas, establish an hourly fire watch patrol."

As discussed above the licensee had an hourly fire watch patrol in this area.

This is an open item pending completion of the licensee's actions to correct the suppression system installation (50-323/85-34-01).

(5) Fire Dampers

In a number of plant locations, fire dampers were not installed per manufacturer's installation requirements or the provisions of National Fire Protection Association (NFPA) Standard 90A. The licensee referenced the results of an internal fire hazards analysis which justifies the adequacy of these dampers. Pending submission of this analysis to NRR and our evaluation of it, this issue is considered unresolved (50-275/85-36-04).

In paragraphs 3.a(1-5), the licensee had reported to the NRC inspectors deficiencies in their fire protection systems. In each of these cases, the licensee was taking prompt effective corrective

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action. In each case, the licensee had in effect, since prior to licensing, the proper Technical Specification compensatory measures.

No violations or deviations were identified.

b. Electrical Protection

The Diablo Canyon electrical distribution system was inspected to verify compliance with Appendix R.III.G.2 and 3 requirements. This inspection was performed on a sample of components and circuits and verified by in-plant walkdown of wiring, conduits and raceways. No conditions were identified that did not conform to Appendix R requirements except as previously identified by Appendix R exemption requests.

(1) Common Bus Concern

A sample of Diablo Canyon circuits were evaluated to verify that circuit breaker coordination satisfied the common bus concern. Of the areas examined, no discrepancies were identified.

(2) Common Enclosure

All circuits are protected by coordinated circuit breakers. Each load is protected individually. All Class 1E circuits are separated and run in separate raceways or conduits. Non-Class 1E circuits are not run with Class 1E cables. Of the areas examined no discrepancies were noted.

(3) Spurious Signals

The licensee presented the results of their analysis for this concern. It was demonstrated that the components of interest would either fail safe or that the consequences of their failure would not inhibit the ability to safely shutdown the plant. The licensee produced a test result which demonstrated that a second fire would not start during a fire due to the failure of current transformers in his plant. Of the areas examined no discrepancies were noted.

(4) High-Low Pressure Interface

One high-low pressure was identified and the plant had made provision to close the valves and remove power when the plant is in operation. Of the areas examined no discrepancies were noted.



(5) Alternate Shutdown Separation

The licensee demonstrated electrical separation from the control room for his remote and dedicated shutdown panels. IN-85-09 is closed.

No violations or deviations were identified.

4. Section III.G.3 and III.L Compliance

The licensee (PG&E) indicated that in the event of a fire in the control room or cable spreading room, alternative shutdown capability was available. Thus the provisions of Sections III.G.3 and III.L of Appendix R to 10 CFR 50 are applicable. Section III.G.3 of Appendix R to 10 CFR 50 requires that the alternative shutdown capability be independent of the cables, systems or components in the fire area or zone under consideration. Section III.L.1 requires that the alternative shutdown capability be able to achieve and maintain hot standby conditions and achieve cold shutdown within 72 hours. Section III.L.3 requires that the alternative shutdown capability shall be independent of the specific fire area and shall accommodate post-fire conditions where offsite power is available and where offsite power is not available for 72 hours and that procedures shall be in effect to implement the capability. The alternative shutdown capability provided for the control room and for the cable spreading room consist of a hot shutdown panel and a dedicated shutdown panel, and local operations for diesel generators and various valves and breakers. The hot shutdown panel provides for control of auxiliary feedwater flow, charging pump flow, condensate storage tank level, steam generator pressure and level, and monitoring of source range. The dedicated shutdown panel provides the control for pressurizer auxiliary spray and monitoring of pressurizer pressure and level, reactor coolant system hot and cold leg temperature, and steam generator pressure and level. The installation of the hot shutdown and dedicated shutdown panels with the associated transfer controls and instrumentation conforms to the Appendix R criteria for the alternative shutdown capability.

The alternative shutdown capability is intended to be utilized through procedure No. OP AP-8, "Control Room Inaccessibility Procedures", Revision 3 approved November 15, 1985, for Units 1 and 2.

The shutdown procedure identifies the actions needed to achieve cold shutdown for the control room fire. The procedure was evaluated to verify that the alternative shutdown capability provides for reactivity control, reactor coolant makeup, decay heat removal and monitoring needed for plant parameters and support equipment for safe shutdown. The procedure utilizes equipment, controls and instrumentation independent of the control room. The procedure identifies the actions necessary to accommodate post-fire conditions where offsite power is available and where offsite power is unavailable. The procedure was judged to effectively handle fire damage to control circuits within the control room.

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A walkdown of the procedures by the inspectors indicated proper identification and accessibility of transfer controls, control switches, circuit breakers, manual valves and other equipment needed to achieve safe shutdown. Additionally, portions of the procedure walkdown in conjunction with the plant operators, verified identification and accessibility of safe shutdown equipment. Equipment was readily identified by component identification tags and was accessible. The licensee presented a communication analysis for alternate shutdown procedure, and, during the procedure walk-through, the communication was determined to be adequate. The shutdown procedure requires a minimum staffing of four plant operations personnel. A walkdown of the procedure by the inspectors assured that the minimum manpower required by the procedure was capable of performing the identified tasks in the required time. Plant personnel utilized in the procedure have received training through classroom reviews of the procedure and actual walkdowns. Additionally, the procedural material was included in the licensed operator requalification training, which is performed annually.

No violations or deviations were identified.

5. Compliance with Appendix R Section III.J., Emergency Lighting

The emergency lighting was examined to determine compliance with Appendix R Section III.J. Eight-hour battery powered lights were provided in all areas required for safe shutdown and in the access and egress routes thereto.

No violations or deviations were identified.

6. Compliance with Appendix R Section III.O, RCP Lube Oil Collection System

The licensee's Reactor Coolant Pump Lube Oil Collection Systems appears to meet the license commitments for Diablo Canyon as delineated in their December 1984 Appendix R submittal. The licensee has made provision to periodically ensure that the lube oil collection tanks are drained. Open Item (50-323/85-15-01) is closed.

No violations or deviations were identified.

7. Plant Tour

a. Housekeeping

The housekeeping in the plant appeared to be in good order. Combustibles were controlled and not allowed to accumulate to unsafe levels.

b. Equipment

Fire protection systems and equipment appeared to be in good working condition and to be well maintained. Fire extinguishers were in place and had their current inspection tags attached. Fire doors appeared to be operable and well maintained.

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No violations or deviations were identified.

8. Follow-up on Previously Identified Items

a. (50-275/85-05-01) Closed, Fire Pre-Plans

Diablo Canyon fire pre-plans were examined and appear to meet NRC guidelines. The drawings while helpful are not a requirement. This item is closed.

b. (50-323/85-15-02) Closed, Fire Door Problems

During this inspection, no fire door problems were encountered. The licensee's program to keep fire doors closed and operable appears to be working. This item is closed.

No violations or deviations were identified.

9. Exit Meeting

On November 22, 1985, an exit meeting was held with members of the licensee's staff. The items listed in this report were discussed at that time.

10. Telecon on December 12, 1985

On December 12, 1985, the Lead Regional Inspector held a telephone conference call with members of the licensee's staff to clarify certain issues discussed in this report.

No violations or deviations were identified.

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