

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-275/94-23
50-323/94-23

Licenses: DPR-80
DPR-82

Licensee: Pacific Gas and Electric Company
77 Beale Street, Room 1451
P.O. Box 770000
San Francisco, California

Facility Name: Diablo Canyon Nuclear Power Plant, Units 1 and 2,

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

Inspection Conducted: September 12-16, 1994

Inspector: L. T. Ricketson, P.E., Senior Radiation Specialist
Facilities Inspection Programs Branch

Approved:

B. Murray
B. Murray, Chief, Facilities Inspection
Programs Branch

10/6/94
Date

Inspection Summary

Areas Inspected (Units 1 and 2): Routine, announced inspection of the licensee's implementation of the revised 10 CFR Part 20 and a review of preparations for the upcoming Unit 2 refueling outage.

Results (Units 1 and 2):

- The radiation worker training, radiation protection technician training, and contract radiation protection technician training properly addressed the hazards, procedural requirements, and worker responsibilities associated with controlling and accessing high and very high radiation areas (Section 1.1.1).
- Appropriate procedures had been implemented for guidance in controlling access and work in high and very high radiation areas (Section 1.1.2).
- The primary implementing procedure dealing with declared pregnant women and embryo/fetus doses needed minor additions to make it compatible with the revised 10 CFR Part 20 (Section 1.2.2).

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- Respiratory protection training appropriately addressed the importance of maintaining low total effective dose equivalent (Section 1.3.1).
- Implementing procedures provided sufficient guidance to radiation protection personnel to enable them to determine if the use of respiratory protection equipment was the proper means to achieve the lowest total effective dose equivalent (Section 1.3.2).
- Good results were achieved in reducing respirator use while maintaining low total dose (Section 1.3.3).
- Appropriate guidance was available to conduct a planned special exposure (Section 1.4).
- Overall, implementation of revised 10 CFR Part 20 was appropriate (Section 1.5).
- The radiation protection organization had prepared properly for the upcoming Unit 2 refueling outage (Section 2).

Attachment:

- Attachment - Persons Contacted and Exit Meeting



1 IMPLEMENTATION OF THE REVISED 10 CFR PART 20 (TI 2515/123)

1.1 High and Very High Radiation Areas

1.1.1 Training

The inspector interviewed training representatives and reviewed training handouts and lesson plans and determined the following:

- There was no discussion of high radiation areas in Protected Area Access Training. The inspector determined that this was appropriate because people receiving only this training did not enter the radiological controlled area.
- In Radiation Worker Training, terms were defined and posting and controls were discussed. Worker responsibilities and consequences of procedure violations were included. Examples of very high radiation areas were present.
- Radiation Protection Technician Continuing Training included discussion of 10 CFR Part 20 revisions and industry events related to high radiation area problems.

Additionally, the inspector determined that licensed reactor operators were provided training with respect to operations which could change radiological conditions within the plant and which may result in the creation of high radiation areas.

1.1.2 Procedures

The inspector compared the licensee's implementing procedures for control of access to high radiation areas (in accordance with 10 CFR 20.1601) and control of access to very high radiation areas (in accordance with 10 CFR 1602) with the guidance contained in Regulatory Guide 8.38.

The primary implementing procedures were RCP D-220, "Control of Access to Very High Radiation Areas," Revision 7, and RCP D-221, "Control of Access to High Radiation Areas and High-High Radiation Areas," Revision 11A. (A high-high radiation area contained radiation dose rates greater than 1 rem per hour.) Other procedures with related guidance included:

- RCP D-200, "Writing Radiation Work Permits," Revision 9
- RCP D-205, "Performing ALARA Reviews," Revision 4
- RCP D-240, "Radiological Posting," Revision 4
- RCP D-500, "Radiation and Contamination Surveys," Revision 11

The above procedures provided guidance in the areas discussed in Section 1.2 of Regulatory Guide 8.38, with the exception of Item 1.2.5. Item 1.2.5 states, "Procedures should be provided to verify, at least on a weekly basis, that proper controls such as posting and barriers are in place for restricting access to high and very high radiation areas." The inspector noted that the



procedures did not include routine surveillance of the area. However, the licensee was not committed to implementing the provisions of Regulatory Guide 8.38 and did not have a routine surveillance of high-high radiation areas and very high radiations areas. Instead, the licensee relied on self-closing mechanisms and second-person verification to ensure that doors to such areas were locked after personnel exit. Procedures RCP D-220 and RCP D-221 included instructions or checklists implementing the second-person verification. The inspector noted that the procedure for control of high and high-high radiation areas stated: "The independent second check shall be completed as soon as practical following exit from the area," but, "may be delayed for high-high radiation area doors that are within other high-high radiation area doors." The procedure did not state how long the verification could be delayed, but the Radiation Protection Director stated that the expectation was that the verification be delayed no more than 1 hour.

1.1.3 Implementation

The licensee identified 15 areas in access control procedures, which either were or had the potential to be high-high radiation areas and 6 areas which were or had the potential to be very high radiation areas.

Through a review of previous inspection reports and radiological occurrence reports involving high radiation areas and interviews with radiation protection personnel, the inspector determined that the licensee had a recent history (the inspector reviewed the previous 2 years) of problems involving high radiation areas that occurred during outages.

NRC Inspection Report 50-275/93-11; 50-323/93-11 included a Notice of Violation addressing four occurrences in which personnel entered high radiation areas, between October 2 and March 22, 1993, without instrumentation, dosimetry, or radiation protection coverage as required by Technical Specification 6.12.1. NRC Inspection Report 50-275/94-12; 50-323/94-12 included a Notice of Violation which addressed a failure to post a high radiation area, in violation of 10 CFR 20.1902(b). With reference to the second-person verification of locked doors discussed in the previous section, the inspector noted that there were no events involving the failure to lock a door controlling a high-high radiation area or a very high radiation area.

Items identified by the licensee and documented in radiological occurrence reports included an event (No. A0331143) on March 10, 1994, in which a high radiation area was improperly posted around a filter cask and an event (No. A0332478) on March 21, 1994, in which an individual entered a high radiation area in Unit 1 without an alarming dosimeter. The licensee has since adopted a policy that an individual who enters a high radiation area without meeting the procedural and radiation work permit requirements will have his/her access placed in "hold" status and that it will require the approval of the Vice President-Operations/Plant Manager for the individual to return to work.

The inspector toured the radiological controlled area and reviewed the posting and control of high, high-high, and very high radiation areas and determined



that controls were appropriate. The inspector observed activities conducted in accordance with Radiation Control Procedure RCP D-230, "Radiological Control For Containment Entry," Revision 9, and attended the prejob briefing prior to the entry. The inspector determined that the briefing was thorough, including the information necessary to conduct a safe entry at power. Safety instructions included on the radiation work permit were appropriate. No problems were encountered, and the radiation doses received by the personnel as a result of the entry were minimal.

The inspector reviewed selected radiation survey information and confirmed that surveys were made at the distance required by the revised Part 20. Radiation protection technicians were knowledgeable of requirements for controlling high and high-high radiation areas.

The inspector reviewed the control of keys to high-high radiation areas and very high radiation areas and determined that keys were properly controlled.

Computer records indicated that Radiation Protection Director and most of the radiation protection foremen made frequent tours of the radiological controlled area to maintain a high level of visibility and an awareness of working conditions there. Although no regulatory requirement was involved in this issue, the inspector noted that the performance of two foremen were well below the others.

1.2 Declared Pregnant Women and Embryo/Fetus Doses

1.2.1 Training

The inspector reviewed the licensee's Radiation Worker Training and noted that limits and responsibilities were discussed in Lesson No. GRPA4001-3. The text quoted from 10 CFR 20.1208 and discussed the woman's rights and explained that the declaration was required in writing.

1.2.2 Procedures

The inspector reviewed RP1.ID10, "Embryo/Fetus Protection Program," Revision 0, and noted that it did not define what constituted the dose to the embryo/fetus. Licensee representatives provided a draft copy of Revision 1 of the procedure which contained a definition compatible to that in 10 CFR 20.1208(c). The inspector also noted that the procedure did not contain guidance for the maintenance of the records of dose to the embryo/fetus which were equivalent to 10 CFR 20.2106(e). Licensee representatives stated that this would be incorporated into Revision 1 of RP1.ID10.

Guidance for the evaluations of effects of radioactive intakes were contained in RCP D-370, "Evaluation of Internal Deposition of Radioactive Material," Revision 2A. The procedure stated that the methodology of Regulatory Guide 8.36 would be used.



1.2.3 Implementation

There have been women at the site who have utilized this program and have declared as outlined in the procedure. There has been no need for declared pregnant worker dose assessments involving internal exposures using the guidance of Regulatory Guide 8.36.

1.3 Total Effective Dose Equivalent/ALARA and Respiratory Protection

1.3.1 Training

The inspector reviewed lesson plans and noted that Radiation Worker Training discussed the concept of total effective dose equivalent and included examples demonstrating that, at times, not wearing a respirator resulted in a lower total dose.

1.3.2 Procedures

RP1.ID3, "Respiratory Protection Program," Revision 1, included the policy statement, "The use of respirators in the radiologically controlled areas shall be evaluated and controlled so that the total effective dose equivalent to the worker is kept as low as reasonably achievable in accordance with RCP D-205."

RPC D-205, Attachment 10.6, "Respirator Justification Guideline," provided guidance to the licensee's work planner for determining if respiratory protection equipment use was beneficial in maintaining total effective dose equivalent low. The work sheet included a chart of derived air concentration versus dose rates on which an efficiency factor of 20 percent was graphed. According to licensee representatives, the chart provided a default method of determining if respiratory protection was beneficial. Other considerations, such as human factors, could enter into the decision of whether respirators should be used.

1.3.3 Implementation

According to licensee records, approximately 1200 respirators were issued during Refueling Outage 2R5. During Refueling Outage 1R6, which was conducted after the implementation of the revised 10 CFR Part 20 regulations, approximately 170 respirators were issued. This demonstrates that there has been a significant decrease in the use of respirators.

Radiation protection representatives also stated that they had not seen a significant increase in the number of facial contaminations, even though respirator use has been reduced. Likewise, the licensee has not noted a significant increase in internal exposures. Overall, the licensee has had good success in maintaining worker total effective dose equivalent ALARA.

Acceptance of the total effective dose equivalent concept by the radiation workers has been good. However, on one occasion, because workers were hesitant to perform a specific job without respirators, the licensee conducted special sessions to discuss respiratory protection practices and answer worker



questions concerning the new philosophy behind the revised 10 CFR Part 20. Licensee representatives stated that the session effectively addressed the workers concerns.

The inspector reviewed examples of written evaluations of the need for respiratory protection equipment and found them to be satisfactory.

1.4 Planned Special Exposures

RP1.ID8, "Planned Special Exposure," addressed planned special exposures and included provisions compatible with all requirements of 10 CFR 20.1206. The Senior Vice President and General Manager were listed as the individual who were responsible for final approval of the implementation of this procedure. No planned special exposures had been conducted.

1.5 Conclusions

The radiation worker training, radiation protection technician training, and contract radiation protection technician training properly addressed the hazards, procedural requirements, and worker responsibilities associated with controlling and accessing high and very high radiation areas. Appropriate implementing procedures were used for guidance in controlling access and work in high and very high radiation areas. There have been problems involving high radiation areas, some of these occurring since the implementation of the revised 10 CFR Part 20, on January 1, 1994.

The primary implementing procedure dealing with declared pregnant women and embryo/fetus doses needed minor additions to make it compatible with the revised 10 CFR Part 20.

Respiratory protection training appropriately addressed the importance of maintaining workers' total effective dose equivalent low. Implementing procedures offered sufficient guidance to radiation protection personnel to enable them to determine if the use respiratory protection equipment was the proper means to achieve the lowest total effective dose equivalent. The licensee achieved good results in reducing respirator use while maintaining low total dose.

Appropriate guidance was available to conduct a planned special exposure. No such exposures had occurred.

Based on the above findings, the inspector concluded that the licensee's implementation of these provisions of the revised 10 CFR Part 20 were appropriate.

2 OCCUPATIONAL RADIATION EXPOSURE (83750)

2.1 Planning and Preparation

The inspector performed a review of the radiation protection organization's preparation for the upcoming Unit 2 Refueling Outage (2R6) and determined the following:



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- Radiation protection personnel had reviewed resumes of contract radiation protection technicians and had selected individuals who would supplement the permanent staff. A very high percentage of these individuals were returnees. The inspector reviewed selected resumes for senior contract radiation protection technicians and confirmed that they met qualification requirements.
- Radiation protection personnel had performed work reviews and prepared draft radiation work permits for jobs to be performed during the refueling outage. The inspector reviewed selected examples of radiation work permit packages for high person-rem jobs and determined that they provided appropriate guidance and special instructions for working in the radiological controlled area. The exposure goal for the outage was set at 270 person-rem. The resistance temperature detector removal and modification was projected to result in just over 60 person-rem. Steam generator work, including eddy current testing, will probably contribute approximately 40 person-rem. The site goal for both units for 1994 was 645 person-rem. The 1994 Unit 2 refueling outage (1R6) resulted in approximately 350 person-rem.

The inspector determined that the radiation protection organization had sufficient supplies of anti-contamination clothing, portable instrumentation, dosimetry, temporary shielding, and portable ventilation to support the Unit 2 outage.

2.2 Conclusions

The radiation protection organization had prepared properly for the upcoming refueling outage.



ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

- *T. Bast, Work Planning Supervisor
- *G. S. Boiles, Dosimetry Supervisor
 - S. Ehrhardt, Radiation Protection Engineer
 - W. H. Fujimoto, Vice President and Plant Manager
- *R. Gray, Radiation Protection Director
 - C. Helmen, Radiation Protection Engineer
- *K. Hubbard, Regulatory Compliance Engineer
- *T. Irving, Radiation Protection General Foreman
- *L. Sewell, Radiation Protection Engineer
- *R. Snyder, Chemistry/Radiation Protection, Training Leader
- *W. Rising, Quality Assurance, Auditor
- *D. Taggart, Site Quality Assurance Director

1.2 NRC Personnel

- *M. Tschiltz, Resident Inspector

*Denotes personnel that attended the exit meeting. In addition to the personnel listed, the inspector contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on September 16, 1994. During this meeting, the inspector reviewed the scope and findings documented in this report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspector.

