

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-275/86-08 and 50-323/86-08
Docket Nos. 50-275 and 50-323
License Nos. DPR-80 and DPR-82
Licensee: Pacific Gas and Electric Company
77 Beale Street, Room 1435
San Francisco, California 94106
Facility Name: Diablo Canyon Units 1 and 2
Inspection at: San Luis Obispo County, California
Inspection conducted: March 3-7, 1986

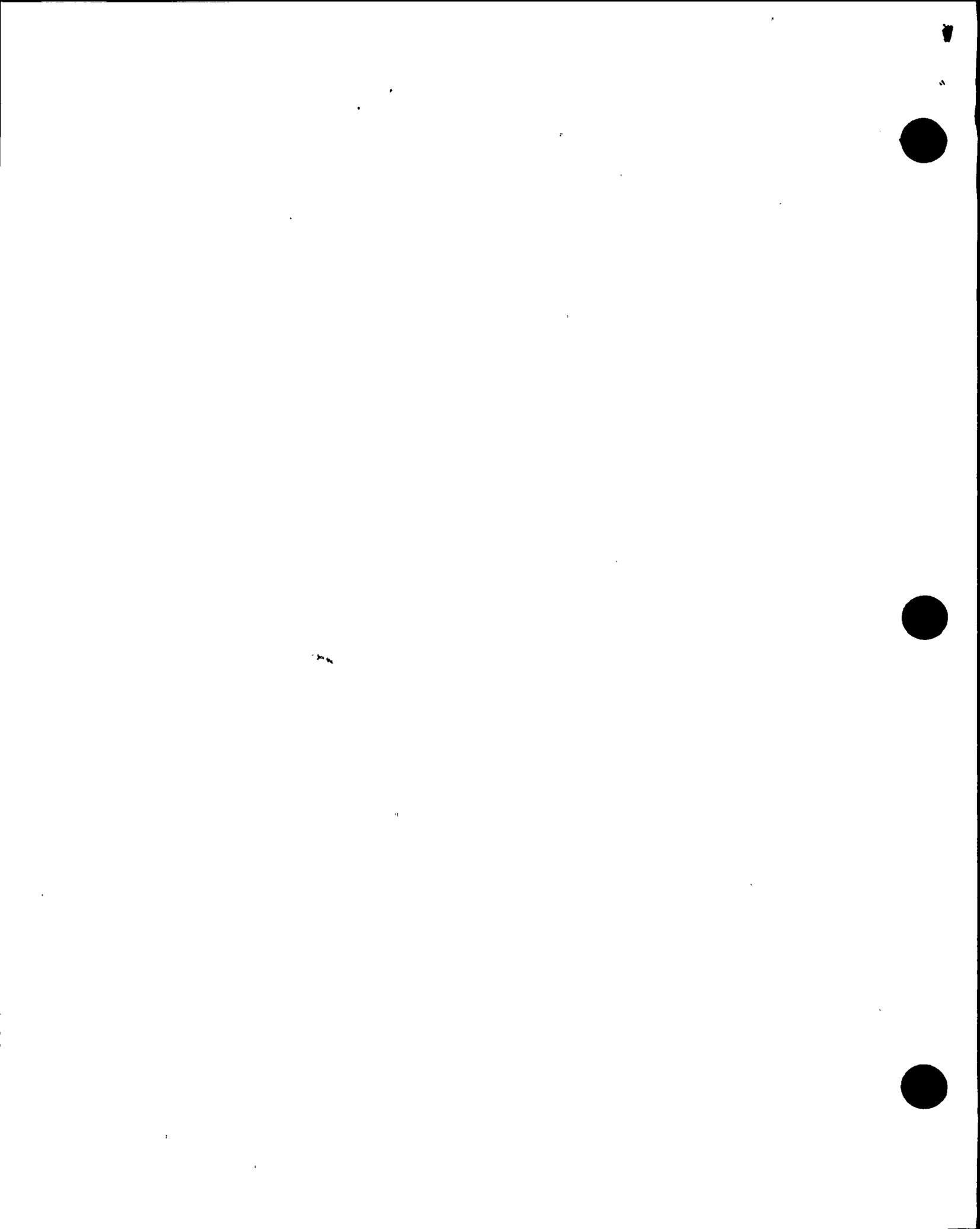
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Facilities Radiological Protection Section

Summary:

Inspection on March 3-7, 1986 (Report Nos. 50-275/86-08 and 50-323/86-08)

Areas Inspected: Routine unannounced inspection of actions on previous inspection findings, control of radioactive materials and facility tours. Inspection procedures 92701, 83521, 83726 and 84521 were covered.

Results: No violations or deviations were identified.



DETAILS

1. Persons Contacted

PG&E Personnel

*R. C. Thornberry, Plant Manager
*J. V. Boots, Manager, Chemistry and Radiation Protection (C&RP)
*R. P. Powers, Senior C&RP Engineer
*T. L. Grebel, Senior Regulatory Compliance Engineer
D. D. Malone, Senior I&C Engineer
H. W. Fong, C&RP Engineer
D. Reed, Supervising I&C Technician
R. L. Johnson, C&RP Foreman
J. A. Hays, C&RP Foreman

Contractors

C. G. Rao, Startup Supervisor (PTGC/Startup)

NRC Inspectors

T. J. Polich, Acting Senior Resident Inspector
T. M. Ross, Resident Inspector
M. L. Padovan, Resident Inspector

*Denotes those present at the exit briefing on March 7, 1986.

In addition to the individuals identified above, the inspectors met and held discussions with other members of the licensee's and contractor's staffs.

2. Licensee Actions on Previous Inspection Findings

(Closed) Followup Radwaste-Startup (50-323/86-03-03): Item regarding the examination of the final test results and data analysis of tests conducted during power ascension to evaluate system performance for Unit 2. Inspection Reports 50-323/85-39 and 50-323/86-03 described and documented previous NRC inspection findings in this area. Review of test results and data analysis are described in paragraph 3 of this report.

(Closed) Followup - Biological Shield Survey (50-323/86-03-04): Item regarding the examination of survey results during power ascension to determine the effectiveness of the licensee's biological shield survey program. Review of survey results and confirmatory measurements made by the inspectors are described in paragraph 4 of this report.

(Open) Open Items (50-275/86-03-02 and 50-323/86-03-02): Inspection Report Nos. 50-275/86-03 and 50-323/86-03 identified a concern with respect to the licensee's hot chemistry laboratory exhaust being a separate release point that was grab sampled once per quarter. The inspectors visually observed the physical location of the effluent ducts and obtained a copy of the licensee's evaluation of radioactive



discharges from the hood. This matter will be reviewed in a subsequent inspection.

3. Radwaste - Startup (Unit 2)

NRC Inspection Report 50-323/85-39 documents review of the licensee's startup test procedures, effluent monitoring, chemistry and radio chemistry controls. Inspection Report (50-323/85-39) also stated that certain requirements for collection and completion of startup test data had been deleted from test procedures TP 1.16, "Effluent and Effluent Monitoring", and TP 1.17, "Chemical and Radiochemical Analysis" which had been included as part of the startup test program for Unit 1.

During this inspection, the inspectors reviewed selected tests and test results to verify that required tests were conducted in accordance with test procedures TP 1.16 and TP 1.17. From review of this test data and through discussions held with licensee representatives the following observations were noted:

- The licensee had made procedural changes to reinstate the deleted test requirements for procedures TP 1.16 and TP 1.17.
- The licensee had placed a high priority on making the boron concentration measurement system (BCMS) and gross failed fuel detection unit (GFFDU) for both Unit 1 and Unit 2 fully operational. The BCMS for Unit 2 was fully operational with reactor coolant samples and BCMS readings indicating ≤ 10 ppm differences as of February 21, 1986. The Unit 1 BCMS was undergoing calibration and expected to be fully operational within a few weeks. The GFFDUs for both units were actively being worked and are expected to be operational after electronic repairs.
- Condensate polisher decontamination factors (DF) varied throughout the power ascension program. This was due to saltwater inleakage through the main condenser. Secondary chemistry was maintained by the polishers or corrective action taken per plant operating procedures.
- The DF factors for the reactor coolant chemical and volume control let down filters could not be adequately established due to the high purity of reactor coolant water.
- Tests to compare the off gas and liquid process radiation monitors response with radioactivity levels from waste stream samples were not conclusive. Sufficient activity was not available in the waste streams to provide good consistent correlations with monitor calibrations.
- Licensee representatives were aware of the need to perform additional correlation studies as noted in the remarks section of startup test procedure TP 1.16. Procedure CAP D-19, "Correlation of Rad Monitors to Radioactivity," requires correlation studies to be performed on a continuous basis. By review of this procedure, the



inspectors determined that process and effluent monitor correlations would be adequately evaluated when sufficient activity is present.

Based on this review, it was apparent that licensee management had been responsive to the NRC concerns (lack of formality and attention to detail in the startup program) described in Inspection Report 50-323/85-39 and had taken a positive approach in evaluating system performance.

Audits

The inspectors reviewed a quality assurance audit conducted December 16-20, 1985, Report No. 85312T, performed to verify that Diablo Canyon Power Plant (DCPP) had implemented Chapter 14 of the FSAR "Initial Tests and Operations," during the power ascension phase of startup testing program. The audit included: adequacy and implementation of startup test procedures; surveillance test procedures; operating procedures; personnel qualifications; and interviews with responsible individuals. No matters requiring issuance of audit finding reports (AFRs) or nonconformance reports (NCRs) were identified. The audit findings for the areas audited were that, with no exceptions, DCPP had been effectively implementing the procedures required by Chapter 14 of the FSAR.

Based on review of this audit, the inspectors noted that although the audit covered the same program area it did not identify findings similar to those described in Inspection Report No. 50-323/85-39.

No violations or deviations were identified.

4. Biological Shield Survey

The licensee had completed gamma and neutron dose rate measurements at the 4%, 18%, 30%, 50% and 100% power levels during power ascension. Dose rate measurements were taken at prescribed locations inside containment and in areas adjacent to the containment. During this inspection, the licensee had scheduled 25 specific locations to be resurveyed inside of the containment. This resurvey was made to resolve inconsistencies noted between some of the 50% and 100% power readings. On March 4, 1986, the inspectors observed the C&RP technicians performing the resurveys. The inspectors made independent gamma and neutron radiation measurement at the same survey points in Unit 2 containment at 100% power for the purpose of verifying the licensee's biological shield survey data. The independent measurements were made using NRC ion chamber S/N 2691 due for calibration April 15, 1986, and neutron survey meter S/N NP 581701 due for calibration April 26, 1986.

The inspectors measurements were in agreement with readings obtained by the licensee. The location of the survey points were representative of access pathways, penetration areas and strategic biological shields on the 140, 115 and 91 foot elevation levels.

The licensee's preliminary review of the biological shield survey data, conducted by the General Office through the 50% power level, concluded



that all surveyed areas, when extrapolated to the maximum value at 100% power, would meet the FSAR radiation zone requirements.

Based on the results of the reviews, observations and independent measurements, the inspectors determined that the licensee's biological shield survey program was conducted in accordance with Chapter 14 FSAR commitments and the recommendations of RG 1.68 and ANSI/ANS 6.3.1-1980. No problems with shielding effectiveness were identified. Documentation of the licensee's final review of the biological shield survey data will be examined in a subsequent inspection (50-323/86-08-01, Open).

No violations or deviations were identified.

5. Control of Radioactive Materials and Contamination, Surveys and Monitoring (Units 1 and 2)

The inspectors reviewed licensee audits, selected procedures, records of surveys, records of use and calibration of survey and monitoring equipment, airborne sampling records, sealed source inventory, leak test results; and conducted several facility tours to determine the licensee's compliance to 10 CFR Part 20, TS requirements, licensee procedures and recommendations as outlined in various industry standards.

A. Audits

Quality Assurance (QA) Audit Report No. 85303T, conducted December 11-19, 1985, to verify that Diablo Canyon Power Plant (DCPP) had implemented in-plant controls for radiation protection was examined. The audit identified four deficiencies resulting in AFRs Nos. 85-568, 569, 570 and 571 requiring corrective action. The audit concluded with the exception of the four deficiencies, DCPP had been effectively implementing the radiation protection program for in-plant controls. The audit findings and conclusion were based on; a tour of DCPP Units 1 and 2 radiologically controlled area (RCA); interviews with C&RP management personnel; and review of radiation work permits, survey records, RCA access records and logs, personnel contamination records, personnel respiratory protection documentation, and records pertaining to testing of radiation monitoring instrumentation. No NCRs were issued. The probable cause and corrective actions to each AFR were also examined. The inspectors noted that the AFRs were administrative in nature and did not involve any significant safety matters. Based on this examination, the inspectors concluded that the response to each AFR and corrective actions taken appeared appropriate.

The inspectors also briefly interviewed QA personnel conducting an onsite audit covering radioactive effluent controls. Based on this interview the inspectors determined that the QA personnel were qualified for the audit being performed.

No violations or deviations were identified.



B. Surveys, Air Sampling and Procedures

The following procedures were reviewed for implementation of the licensee's radioactive materials radiation and contamination control program:

- NPAP C-200 "General Requirements for Radiation Protection Programs"
- RCS-1 "External Radiation Dose Control"
- RCS-2 "Personnel Contamination Control"
- RCS-6 "Control of Radioactive Materials"
- RCS-7 "Surveys"
- RCP G-6 "Release of Materials from Radiologically Controlled Areas"
- RCP G-7 "Radiation and Contamination Surveys"
- RCP G-8 "Sampling and Measurement of Airborne Radioactivity"
- RCP D-10 "Handling and Accountability of Radioactive Sources"
- RCP S-1 "Plant Airborne Radioactivity Surveillance"
- RCP S-2 "Radiation Contamination Survey Program"

The survey program was discussed with C&RP personnel. Routine surveys are performed on a scheduled basis and reviewed by the C&RP foremen. Survey maps were available for essentially all plant areas and were used to document radiation and contamination results. Copies of completed current survey maps were posted inside of the RCA for worker review. Routine and special surveys, and air sample results required for Special Work Permits including containment entries were examined for the periods November 18-30, December 16-20, 1985, and February 3-14, 1986. Based on this examination it appeared that radiation and contamination surveys, and air sampling were performed and results documented as required.

Personnel contamination survey reports during the period January 1, 1986 to March 7, 1986 were examined. No personnel contaminations requiring radiation dose evaluations had occurred. Contamination levels were noted to be predominantly low. The licensee's goal is less than three personnel contaminations per 10 thousand entries. January 1986 and February 1986 ratios were 3.33 and 5.8 per 10 thousand entries respectively. The inspectors also observed that the licensee maintained a graph of causes of personnel skin and personnel clothing contaminations which will be used as an aid in C&RP and general employee training to minimize occurrences for such



contaminations. It was noted that personnel contaminations were promptly reviewed and evaluated by the licensee.

No violations or deviations were identified.

C. Instrument Calibrations and Calibration Facility

The inspectors discussed the calibration program for portable radiation and contamination survey meters, portable air samplers, and portal monitors with the supervising I&C technician. The inspectors also reviewed calibration records of selected surveying and monitoring equipment and the licensee's computer master tracking system data sheets (file 12) for tracking instrument calibrations. The licensee had dedicated three employees to performing instrument calibrations, the SI&CT and two I&C technicians. The inspectors were informed and noted by records review that the licensee evaluates the past use of survey meter and air samplers, when found to be out of calibration specifications during recalibrations, to determine if there were any significant effects on survey and air sampling results. The licensee maintained current calibration certificates verifying that the flow meters used to calibrate air sample flows had been calibrated with equipment that is traceable to the National Bureau of Standards.

Calibrated survey meters and air samplers were maintained in a separate room at the entry to the RCA, and all were noted to have current calibration tags attached. Tags indicating that the daily instrument response test had been performed were also attached to the portable survey meters. The inspectors conducted response tests on several selected portable ion chambers that were ready for use. The instruments tested were found to be operational and responded properly to the licensee's check source located in the same room. Survey meters in need of calibration or repairs were maintained in a special cabinet in separate location within the RCA.

The inspectors also performed a response test of the portal monitors at the security building exit area. The test was conducted by using a licensee 1 uCi Cesium-137 source near the body and at normal walking speed. Each of the two monitors alarmed timely and were sufficiently audible. The inspectors were directed by a security person to remain in the area while he attempted to notify C&RP staff that a portal monitor had alarmed. The inspectors informed this individual that they were inspecting the portal monitors response and were pleased to note the security person took appropriate action.

The inspectors toured the shielded calibration facility containing the licensee's 50 Ci Cesium-137 instrument calibration source. The calibration facility was posted as required by 10 CFR Part 20, access controls were consistent with TS 6-12, and keys were controlled as required by licensee procedures. With the source raised to the upper stop and shutter open, the inspectors made radiation measurements along the walk outside of the facility and the above floor level directly over the source well. No radiation



levels above that permitted for unrestricted areas were identified. Radiation levels inside of the calibration facility with the source exposed at the upper most position were not excessive. The licensee also uses temporary shielding as necessary to aid in exposure control when performing instrument calibrations of the upper ranges.

The licensee has nearly completed a new instrument calibration and repair room located on the 119 foot elevation level of the turbine building. Only low level activity sources will be used in this area.

No violations or deviations were identified.

D. Sealed Source Inventory and Leak Tests

Semiannual inventory and leak tests of radioactive sealed sources were examined. The master and sealed source inventory, source usage, and leak test results are maintained in the RCA by the C&RP Department. Sealed sources used for various calibration work were signed in and out when used. Leak tests were performed at the six month frequency as required by TS 3.7.8. Technical Specification 3.7.8 expresses limits for removable contamination of sealed sources in units of microcurie. The licensee's radioactive sealed source leak test log sheet recorded leak test results by using the words "ok" or "satisfactory". The raw data sheets of sealed source wipe test results were maintained in units of dpm/100 cm². Based on inspectors comments, licensee agreed to make the necessary changes and maintain leak test results in the same units noted in the TS.

No violations or deviations were identified.

E. Facility Tours

During the inspection the inspectors toured various areas of the auxiliary and turbine buildings, including the hot chemistry laboratory. The inspectors made independent measurements using NRC ion chamber S/N 2691 due for calibration on April 15, 1986. Based on these tours the following observations were made:

- o On March 5, 1986, the inspectors noted that about one half of the auxiliary operator (AO) control board area located on the Unit 1 site at the 85 foot level was roped off and posted as a radiation area.

The source of radiation was noted to be the moisture trap located within the H₂ gas analyzer control cabinet. Through discussions with licensee representatives, and review of C&RP log book No. 14137, page-81B it was learned that on February 3, 1986, a C&RP technician responded to this area due to an area radiation monitor (RM-10) alarm. The licensee identified the source of radiation, properly posted the area and documented the survey results on report No. 01130. Licensee survey results indicated radiation levels of, 200 mr/hr on the



moisture trap surface, 45 mr/hr maximum on the side of the cabinet, 19 mr/hr at 18 inches from the cabinet and 1 to 2 mr/hr in the middle of the room (AO desk area). The recorded radiation level at the detector was 0.8 mr/hr, which is also the alarm set point. RM-10 was last calibrated on December 11, 1985, and functional checked on February 22, 1986.

The inspectors noted that the licensee had wrapped a lead blanket around the moisture trap to lower the radiation levels to reduce the AOs exposures who frequent the area. Radiation levels measured by the inspectors on two separate occasions indicated that radiation levels can increase by a factor of two depending on the automatically selected system being sampled.

The lowest radiation levels measured by the inspectors were observed to be 3 mr/hr at the surface of the control panel, 1.3 mr/hr at 18 inches and 0.4 mr/hr at the nearest AOs desk. The highest levels were observed to be 6 mr/hr at the surface of the panel, 2.5 mr/hr at 18 inches and 0.8 mr/hr at the AOs desk. The room was typically < 0.5 mr/hr, except the general area within 4 to 6 feet of the control panel.

Figure 12.1-3 of the FSAR classifies the AO control room as a Class 1 zone. Class 1 denotes high occupancy zone for radiation workers with dose rates less than or equal to 1 mr/hr. Based on the dose rates observed by the inspectors the area around the control panel falls in the zone 2 classification (≤ 2.5 mr/hr) which is controlled access with only periodic occupancy. It was observed on several occasions that the room was only occasionally occupied. The licensee was aware of this matter and were evaluating methods for lowering the radiation levels in this area.

The inspectors also noted that the detector for RM-10 appeared to be partially shielded from the radiation source (H_2 analyzer moisture trap) by a lead battery in an emergency light mounted on the wall nearby. The inspectors did not consider this to be a serious problem since RM-10 had alarmed respectively, to the alarm set point (0.8 mr/hr), which was also noted to be the radiation level measured at the detector by the C&RP Department when it had alarmed.

° In the Unit 2 penetration room (100 foot elevation level), a portable HEPA filtered exhaust system had been installed to control airborne radioactive gaseous activity releases due to leakage from the pressurizer steam space sample isolation valve (9354B). The 12 inch exhaust duct from the portable system was being vented to an exhaust opening in the spent fuel pump and filter room via the entry door. There are no exhaust system openings in this area and air is normally exhausted to the upper and lower elevation levels by plant design. The inspectors also observed that this room was negative to the outside yard area by checking air flow direction at the screened openings.



The licensee became aware that valve No. 9354B was leaking on March 3, 1986, when the constant air monitor on the 115 foot elevation level alarmed. Air sample results indicated that only noble gas activity was being released.

At the exit meeting, the inspectors expressed concerns that the licensee had to take such measures as to route exhaust ducting through doors to control airborne activity from this area.

- o The warning sign, "Caution this Automatic Equipment May Start at any Time," for the Unit 2 auxiliary building switch gear supply fan (S-28) room door had apparently been blown off and was lying on the nearby roof area. This was brought to the licensee's attention.

In addition to the above observations, the inspector observed that all radiation areas and high radiation areas were posted as required by 10 CFR Part 20, and access controls were consistent with TS 6.12 and licensee procedures. The inspectors also conducted wipe tests from selected step off pads of contaminated controlled areas. No detectable removal contamination was identified using licensee contamination survey meters.

No violations or deviations were identified.

6. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on March 7, 1986. The scope and findings of the inspection were summarized. The licensee was informed that no violations or deviations were identified.

4-2-1974

