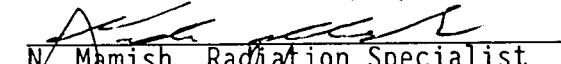
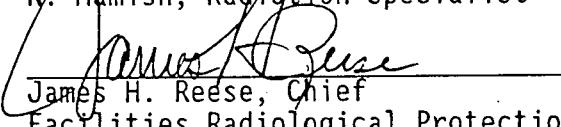


U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos.: 50-206/93-18, 50-361/93-18, 50-362/93-18  
License Nos.: DPR-13, NPF-10, NPF-15  
Licensee: Southern California Edison Company (SCE)  
Irvine, California 92718  
Facility: San Onofre Nuclear Generating Station (SONGS) Units  
1, 2 and 3  
Inspection location: San Diego County, California  
Inspection duration: July 12 - 16, 1993

Prepared by:   
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Date Signed  
Approved by:   
James H. Reese, Chief 8/5/93  
Facilities Radiological Protection Branch  
Date Signed

Summary:

Areas Inspected: Routine, announced inspection of occupational exposure. Selected areas of the licensee's Radiation Protection Program were examined, involving: followup, followup of items of noncompliance, audits, ALARA, and outage-related radiological controls. Inspection procedures 92701, 92702, and 83729 were used.

Results: The licensee's programs for controlling occupational exposure appeared to be adequate in the areas observed. Weaknesses were identified in relation to posting and labeling practices. A violation for a failure to post a high radiation area was identified (see Section 4.c.(1)). Additionally, an inspection followup item was noted involving radiological controls associated with work on the Unit 2 pressurizer.

## DETAILS

### 1. Persons Contacted

#### Licensee

\*T. Adler, Unit 2/3 Health Physics Supervisor  
D. Axline, On-Site Nuclear Licensing  
J. Barrow, Unit 2/3 General Foreman  
\*R. Erickson, San Diego Gas & Electric Site Representative  
\*L. Cash, Maintenance Manager  
\*J. Fee, Assistant Health Physics Manager  
O. Flores, Chemical Engineering Supervisor  
\*T. Frey, On-site Nuclear Licensing  
\*W. Frick, Assessment Engineering Supervisor  
\*E. Gatto, Health Physics Training Supervisor  
G. Gibson, On-site Nuclear Licensing Supervisor  
\*R. Giroux, On-site Nuclear Licensing  
\*E. Goldin, Health Physics & Environmental Supervisor  
\*P. Knapp, Health Physics Manager  
\*R. Krieger, Vice President and Site Manager  
\*J. Madigan, Health Physics Supervisor  
\*W. Marsh, Nuclear Regulatory Affairs Manager  
\*G. Plumlee, On-site Nuclear Licensing  
\*J. Reilly, Engineering, Construction, and Fuel Services Manager  
\*J. Scott, Health Physics Special Projects Supervisor  
\*S. Schofield, Health Physics Engineering Supervisor  
\*M. Short, Station Technical Services Manager  
\*A. Tally, Unit 1 Health Physics Supervisor  
\*D. Warnock, Assistant HP Manager  
\*H. Wood, Quality Assurance

#### NRC

\*C. Caldwell, Senior Resident Inspector

(\*) Denotes those individuals who attended the exit meeting on July 16, 1993. The inspector met and held discussions with additional members of the licensee's staff during the inspection.

### 2. Followup (92701)

- a. Item 50-361/93-19-01 (Closed): This item concerned a disagreement involving radiochemical analysis of reactor coolant system for Iodine-133. The licensee had performed an evaluation to investigate the bias between the NRC and the Units 2/3 chemistry results. The results of the licensee's evaluation had concluded that the efficiency of the U2/3 chemistry germanium detector, which had been high by 11%, was the cause of the disagreement.

Following the completion of the evaluation, the licensee updated the Units 2/3 spectroscopy system with the new efficiency file. The inspector noted, however, that the licensee's evaluation had not addressed the root cause of the disagreement. In discussion with

the inspector, the licensee stated that the bias did not appear to have implications on the iodine release rates or offsite gaseous effluent releases.

The inspector had no further questions in this matter.

- b. Item 50-361/93-19-02 (Closed): This item involved an inadequate method of determining Lower Level of Detection (LLD) for gaseous waste samples. The licensee had performed an evaluation which included a study of detector parameters (i.e., background, efficiency, and sample volume) to calculate minimum counting times for compliance with Offsite Dose Calculation Manual (ODCM) LLD limits. Spectroscopy procedures had been revised to require LLD evaluations under certain conditions and notifications of Effluent Engineering when changes occur that could result in changes to the LLDs of effluent samples. Additionally, minimum counting times were established to ensure that LLD requirements were achieved.

The inspectors had no further questions in this area.

- c. Item 50-361/93-19-04 (Closed): This item involved various observations made during a Post Accident Sampling System (PASS) operational test. The observations included the licensee's inability to obtain a diluted reactor coolant sample within the time estimate used in the design change procedure, under-reported boron concentrations by the PASS, inability of chemistry technicians to identify remote radiation monitor readout, an incorrect valve lineup by a chemistry technician, and insufficient procedural guidance for determination of purging the diluted sampling system required.

The licensee performed a series of evaluations and procedural changes to address the noted observations. A time/motion study resulted in a chemistry procedure change to wait for three hours post-LOCA [Loss of Coolant Accident] in order ensure that calculated doses would not be exceeded. Re-test of the boron concentrations revealed that the boronometer had been acceptable for use. Procedural revisions had been completed to include the area radiation monitor in the physical layout, provide specific guidance on valve lineups, and specific cautions to flush the PASS with nuclear service water.

The inspectors had no further questions in this matter.

- d. Item 50-361/92-22-02 (Closed): This item involved three anomalies associated with the 1991 Annual Environmental Report. The anomalies included an erroneous referenced 10 CFR 20 Appendix B limits, a higher than expected direct radiation dose on TLD [Thermoluminescent Dosimeter] No. 42, and an unclear use of occupancy factors by the licensee.

The licensee informed the inspector that the anomalies had been corrected in the 1992 Annual Environmental Monitoring Report. In review of the report, the inspector noted that the 10 CFR 20 Appendix B limits had been corrected, and the occupancy factors had been clarified. In discussions with the inspector, the licensee stated that the high reading by TLD No. 42 was due to the fact that the TLD was located at an elevation of approximately 1,800 feet above sea level with no shielding in its proximity.

The inspectors had no further questions in this matter.

### 3. Followup of Items of Noncompliance (92702)

- a. Item 50-362/92-01-01 (Closed): This violation involved the failure to post a radiation area. As corrective action, the licensee had immediately posted the area and surveyed the container that had generated the radiation area. During tours of the facility, the inspectors did not identify additional examples of unposted radiation areas.

The inspectors had no further questions in this matter.

- b. Item 50-361/92-19-03 (Closed): This violation concerned the failure to maintain a backup grab sample capability of the PASS. The licensee had concluded that the disconnected PASS valve had been rendered inoperable due to an inadvertent bumping of the electrical connectors associated with the valve.

As corrective action, the licensee immediately reconnected the electrical lead to the valve. Spliced connectors were subsequently used to eliminate the potential for dislodgement. Additionally, other valves on the PASS skid were cycled and verified operable, and associated PASS valves with similar connectors were verified connected and mechanically secured.

The inspectors had no further concerns in this area.

### 4. Occupational Exposure Controls During Extended Outages (83729)

The inspector evaluated this program area by interview of cognizant personnel, review of procedures and records, and observation of work in progress. Additionally, the inspector conducted tours of the Unit 2 Containment Building, Auxiliary Building, and Radioactive Waste Building. Observations were made involving audits and surveillances, ALARA [As Low As Reasonably Achievable], personnel contamination, and labeling & posting.

#### a. Audits & Surveillances

The inspector reviewed Audit Report SCES-318-93, "Units 1, 2, and 3 Health Physics Program," completed on May 31, 1993. The audit had been based on a large number of performance based surveillances of

### Health Physics Division activities.

The audit had identified minor deficiencies associated with record keeping and procedural guidance. The deficiencies, which were determined to be isolated instances, were dispositioned as field corrected errors. The inspector noted that the audit & surveillances had been thorough and comprehensive, and corrective actions were appropriately being addressed. No discrepancies were identified.

#### b. Maintaining Occupational Exposures ALARA

The licensee's personnel exposure goal for the Unit 2 refueling outage had been initially set at 262 person-rem. As of July 14, 1993, the collective personnel exposure for the Unit 2 outage was approximately 314 person-rem.

In discussion with the inspector, the licensee stated that the apparent increase in personnel exposure was primarily due to the Unit 2 emergent work with the Steam Generator feed rings repair (70 person-rem), and the replacement of four Reactor Coolant Pumps (RCPs) Heat Exchangers (38 person-rem). As a result, licensee management had reassessed the ALARA goal for the Unit 2 outage and set a new goal of 377 person-rem. The inspector noted, however, that the licensee lacked a program to track, or follow up, on rework activities or job evolutions.

The inspector observed and interviewed various workers during tours of the Unit 2 containment. For the most part, all interviewed personnel were knowledgeable of work area dose rates and ALARA practices. Workers were observed moving to low dose rate areas to perform work and hold conversations. In addition, the inspector noted that the licensee was extensively using lead shielding and remote surveillance equipment (i.e., cameras) to maintain personnel exposures ALARA.

#### c. Outage-Related Radiological Controls

The inspector conducted tours of the U2 Containment Building, Auxiliary Building, and Radioactive Waste Building to observe the performance of outage-related controls. Additionally, the inspector reviewed licensee records and procedures associated with radiation and contamination surveys. Observations were made regarding posting & labeling, personnel contamination, and specific job controls.

##### (1) Posting & Labeling

During facility tours, the inspector performed independent dose-rate radiation surveys using the following instruments:

- NRC Geiger-Mueller tube beta-gamma survey instrument, Model Xetex 305B, Serial No. 036064, due for calibration August 12, 1993
  - Licensee ion chamber beta-gamma survey instrument, Model RO-2, Serial No. 2346, due for calibration October 9, 1993
- (a) In touring the 17'6" (i.e., 17-foot 6-inch) elevation of the Unit 2 containment on July 13, 1993, the inspector observed that an accessible area inside the biological shield had not been posted as required. The inspector noted that radiation levels near Reactor Coolant Pump (RCP) P-001 drain line had been 750 mrem at contact and 150 mrem at 12 inches.

The inspector immediately informed a Quality Assurance (QA) auditor who was accompanying the inspector. The QA auditor agreed with the inspector's observation and stated that he would call the lead Radiation Protection Technician (RPT) to survey the area. Survey of the area revealed that the dose rate of RCP P-001 drain line at 12 inches were in access of 100 mrem/hr. The area was promptly posted as a High Radiation Area (HRA).

Upon detailed survey of the area, an RPT found an HRA posting facing the floor around the drain line. The licensee indicated that the HRA posting had probably fallen as a result of the containment chillers directly blowing air toward the area. The detailed survey of the drain lines revealed that the dose rates were 800 mrem at contact and 125 mrem at 12 inches (about 30 cm).

(i) Licensee Requirements

TS 6.11 requires procedures for personnel radiation protection to be prepared consistent with the requirements of 10 CFR 20 and shall be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

Licensee procedure S0123-VII-7.4, "Posting," Revision 16, dated January 14, 1993, establishes radiological posting requirements. Section 6.1.3 requires that each accessible area having radiation levels greater than or equal to 100 mrem/hr measured at 30 cm from the source or sources, shall be identified as a High Radiation Area and shall be conspicuously posted with a sign bearing the radiation caution symbol and the words: "CAUTION HIGH RADIATION AREA."

(ii) Licensee Assessment

In discussions with the inspector, the licensee stated that since the area around the RCP drain line was barricaded, workers would contact radiation protection to obtain the current radiation levels. The licensee, however, acknowledged the inspector's observation and agreed that the area should have been posted.

(iii) NRC Assessment

The inspector reviewed records of previous radiation surveys of the 17'6" elevation. Survey records of July 1 and 2, 1993, clearly indicated that the RCP drain line area had been appropriately identified and posted. However, survey records of July 6 and 9, 1993, did not clearly identify the RCP drain line area as a HRA.

The licensee acknowledged the inspector's observation and indicated that survey records could have been better documented. By discussion with RPTs, the inspector verified that the area had been previously identified as a HRA.

The inspector concluded that the failure to post the area around the drain line piping of RCP P-001 as a high radiation area constituted a violation of TS 6.11 (50-361/93-18-01).

- (b) In touring the 17'6" elevation of the Unit 2 containment on July 13, 1993, the inspector observed one unlabeled bag containing contaminated insulation, and two labeled bags containing highly contaminated wall fragments from the Unit 2 containment emergency sump. The two labeled bags, however, lacked radiation and contamination survey information.

The licensee promptly corrected both discrepancies by performing radiation and contamination surveys, and recording the missing information on the labels. The survey indicated that both bags read less than 2 mrem per hour at contact.

- (c) While touring the Unit 2 Radioactive Waste Building on July 13, 1993, the inspector observed a posting discrepancy in the valve gallery area of Charging Pump No. 1 Room. The inspector noted that the Zone III posting for a portion of the valve gallery area had partially fallen and was facing the wall instead of the entry way. Additionally, the valve and piping insulation appeared to

have degraded and fallen on the floor.

In discussion with RP supervision, the inspector noted that the number and variety of posting and labeling discrepancies observed appeared to warrant improvement in RP attention to detail. The licensee acknowledged the inspector's observations, and stated that the specific problems noted would be promptly corrected.

One violation of NRC requirements was identified.

(2) Personnel Contamination

The inspector reviewed the licensee's personnel contamination events for the Unit 2 refueling outage. As of July 14, 1993, the licensee had initiated 254 personnel contamination reports. In discussion with inspector, the licensee stated that the increase in personnel contaminations was due to the following contributors:

- Decreased nuclear experience among Bechtel work force
  - Containment vent outage resulting in increased temperatures and sweating
  - Decreased use of respirators
  - Elevated contamination levels associated with work related to U2 RCPs
- (a) In review of the personnel contamination data base, the inspector noted that the licensee had initiated 57 contamination reports associated with facial contaminations. The licensee indicated that measures had been taken to limit the number of facial contaminations.

The licensee provided the inspector with a memorandum recommending that face shield be surveyed on a shiftily basis. Additionally, the memorandum stated that when face shields were not in use, they shall be stored in an appropriate location (i.e., hat rack, off the floor, away from potentially contaminated components) so as to preclude the potential for facial contamination.

However, the inspector noted in touring the Unit 2 Containment that numerous face shields were scattered in contaminated areas. The licensee acknowledged the inspector's observation and stated that efforts would be made to minimize the spread of facial shields in contaminated areas.

- (b) In review of personnel contamination records, the inspector noted that several facial contaminations had occurred during work associated with the Unit 2 pressurizer on June 13, 1993. Based on the records reviewed and discussion with licensee personnel, workers performed some welding on a nozzle at the top of the pressurizer without health physics coverage and without the required air sampling.

The licensee informed the inspector that a Division Investigation Report (DIR) had been initiated to examine the circumstances of the event. The licensee added that the DIR had not been completed, and that some of the information regarding the event had not been clarified. This item will be considered unresolved (50-361/93-18-02).

An unresolved item is a matter about which more information is necessary in order to ascertain whether it is acceptable, a violation, or a deviation.

(3) Specific Job Controls

At the time of the inspection, the licensee was performing sludge lancing and secondary side inspection of the steam generators. The inspector reviewed the associated radiation and contamination surveys, radiation exposure permit, tailboard check sheets, and observed workers performing Foreign Object Search and Recovery (FOSAR) activities. No concerns were noted.

With the exceptions of the discrepancies noted above, the licensee's programs for controlling external radiation exposure appeared adequate in meeting the licensee's safety objectives.

One violation of NRC requirements, and one unresolved item were identified.

5. Exit Interview

The inspector met with members of licensee management at the conclusion of the inspection on July 16, 1993. The scope and findings of the inspection were summarized. The licensee acknowledged the inspector's observations.