
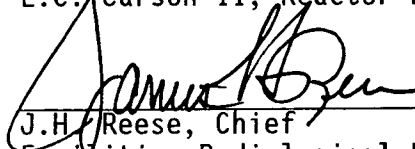


U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos.: 50-206/93-10, 50-361/93-10, 50-362/93-10
License Nos.: DPR-13, NPF-10, NPF-15
Licensee: Southern California Edison Company (SCE)
Irvine Operations Center
23 Parker Street
Irvine, California 92718
Facility Name: San Onofre Nuclear Generating Station (SONGS)
Units 1, 2 and 3
Inspection at: SONGS Site, San Diego County, California
Inspection Conducted: May 3-7, 1993

Inspector: 
L.C. Carson II, Reactor Radiation Specialist 6/2/93
Date Signed

Approved by: 
J.H. Reese, Chief 6/3/93
Facilities Radiological Protection Branch Date Signed

Inspection Summary:

Areas Inspected: This routine announced inspection covered the licensee's planning and preparation for the Unit-2 Cycle-7 (U2C7) refueling outage in the areas of radiation protection and ALARA planning. Inspection procedures 83729 and 83750 were used.

Results: The licensee's planning and preparation for the U2C7 outage were adequate for meeting radiation protection and ALARA safety objectives. No violations or deviations were identified.

DETAILS

1. Persons Contacted

SCE Personnel

- *R. Waldo, Station Manager
- P. Knapp, Manager, Site Health Physics (HP)
- *D. Breig, Manager, Site Technical Services
- *D. Warnock, Assistant HP Manager
- *J. Fee, Assistant HP Manager (Acting Manager Site HP)
- M. Lewis, Supervisor HP/Radioactive Material Control (RMC)
- *J. Barrow, HP General Foreman
- S. Enright, HP/RMC Lead
- S. Eichenberger, HP Planner
- T. Adler, HP Supervisor Units 2/3
- E. Gatto, HP Technical Assistant
- D. Corbett, ALARA Engineer
- R. Wood, ALARA Supervisor
- *S. Sewell, Dosimetry Supervisor
- *D. Wilcockson, On-site Nuclear Licensing
- *T. Lorens, Lead On-site Licensing Engineer
- *M. Farr, On-site Licensing Engineer
- *D. Axline, On-site Licensing Engineer

Others

- *J. Russell, NRC Resident Inspector
- *J. Ball, NRC Inspector

(* Denotes those individuals who were at the exit meeting held on May 7, 1993. Additional licensee personnel were contacted and present at the exit meeting, but are not reflected in the above listing.

2. Occupational Exposure and Occupational Exposure During Extended Outages (83750 and 83750)

a. Organization and Personnel Changes

The Health Physics (HP) Division established the Radioactive and Mixed Waste Minimization (RMWM) Department in 1993 to address radwaste issues such as mixed waste, interim storage of low level waste, the loss of solid radwaste burial access in Nevada, and other radwaste management issues. The RMWM group consisted of a supervising project engineer, a waste minimization technician, and the site coordinators for contract radwaste services. Some of the programs that the RMWM group has implemented will be further detailed in Section 2d(2) of this report.

b. Planning and Preparation for the Unit-2 Refueling Outage

The inspector examined radiation protection and ALARA planning for the Unit-2 Cycle-7 (U2C7) refueling outage to determine if the licensee was consistent with NRC Regulatory Guide (RG) 8.8

"Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Reasonably Achievable," and RG 8.10 "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Reasonably Achievable." Discussions were held with SONGS health physics (HP) supervision on exposure goals, personnel training, work scope, and plant design changes. U2C7 outage preparation was in progress at the time of this inspection.

(1) ALARA Goals

The U2C7 outage ALARA exposure goal was 262 person-rem. The Health Physics Division considered the U2C7 ALARA goal as a challenge to each work group. Each group established its own exposure goal. The U2C7 jobs with the most potential for exposures were as follows:

- * Maintenance & Surveillance Work
- * Refueling Floor Activities
- * Reactor Vessel and other In-Service Inspection (ISI)
- * Reactor Coolant System & Pumps
- * Personnel Tours, Inspection & Support
- * Motor Operated Valve (MOV) work
- * Steam Generator work

The inspector had no concerns with the licensee's ALARA exposure goal.

(2) U2C7 Outage Work Scope and ALARA/Radiation Exposure Permits

The inspector examined the U2C7 work scope to assess its impact on the readiness of the ALARA and HP staff. Discussions were held with the HP manager (HPM), HP planning, Outage manager, and the ALARA staff. Approximately 941 maintenance orders (MOs), and 124 new radiation exposure permits (REPs) had to be written for this outage. There were no anticipated changes that would increase the U2C7 work scope. HP work planning's U2C7 outage preparation schedule did not appear to impact the HP staff's daily operations.

Six U2C7 ALARA Pre-Job Reviews were examined by the inspector, and were found to be performed in accordance with the licensee's procedure. The inspector reviewed the details of U2C7 Health Physics Work Control Plans (HPWCPs) for the following jobs:

- * Steam Generator Work
- * Pressurizer Work
- * Reactor In-Core Instrument Work
- * Reactor Cavity Decontamination
- * Low Pressure Safety Injection Modifications

The inspector had no concerns with the licensee's ALARA planning and preparation prior to this U2C7 outage.

(3) Staffing, Training & Qualifications of U2C7 Personnel

The inspector reviewed SONGS staffing, training and qualifications (T&Q) requirements of personnel associated with the U2C7 outage. Discussion were held with the HPM, dosimetry, training, and outage management. The inspector reviewed the April 1993 U2C7 outage personnel in processing plan and schedule. During the U2C7 outage an additional 956 contract workers will be hired, which includes 121 Sr. HP technicians. Many of the contract HP technicians worked at SONGS during previous outages, and were qualified as HP technicians in accordance with ANSI N 3.1 "Selection, Qualification and Training of Personnel for Nuclear Power Plants." The licensee's schedule revealed that all contract workers will receive a variety of SONGS and NRC required training.

The inspector had no concerns with contract workers T&Q.

(4) ALARA Design and Implementation Reviews

The inspector held discussions with SONGS ALARA engineering personnel on system design change packages (DCPs) that they reviewed. SONGS procedure SO123-VII-3.1, "ALARA Design Review," detailed ALARA engineering requirements for ALARA reviews for system and facility changes, and provided a checklist for such reviews. A completed ALARA DCP checklist, dated February 15, 1993, along with the DCP document review sheet dated January 8, 1993, on adding a cross-connection between the Spent Fuel Pool Cooling (SFPC) and the Shutdown Cooling (SDC) system was examined by the inspector. The inspector found that the licensee's ALARA reviews for the SFPC to SDC cross-tie DCP was satisfactorily performed.

The inspector examined an ALARA engineering assessment, dated May 6, 1993, on the Low Pressure Safety Injection (LPSI) pump seal, coupling, and motor replacement. The assessment covered work area radiological, contamination, and cobalt material considerations. The inspector found the LPSI ALARA assessment was thorough.

The inspector concluded that the ALARA engineering design reviews represented a strength in the HP program.

(5) ALARA Training for Engineers

ALARA training courses for licensee engineers were reviewed by the inspector. All design, project, and system engineers were required to complete the ALARA Design Considerations training course TIP008. The inspector considered the licensee's ALARA training program for engineers as adequate.

The licensee's HP/ALARA planning and preparation for the U2C7 outage period was adequate for accomplishing its radiological safety objectives. The inspector had no concerns in this area.

d. Surveys, Contamination Controls, and Control of Radioactive Material

(1) Source Term Reduction

The inspector examined licensee plans for controlling radiation fields and contamination in Units 2 and 3. The licensee was preparing to chemically decontaminate (Chem-Decon) the Unit 2 reactor coolant system (RCS). At the time of this inspection radiation hot spot flushes were in progress in Unit 3. Additionally, the inspection reviewed the licensee's cobalt minimization.

(a) Chemical Decontamination

The inspector held discussions with the ALARA and chemistry engineering supervisors about the U2C7 Chem-Decon. The licensee scheduled to perform the Chem-Decon during a 14 hour period starting June 6, 1993. Hydrogen peroxide is the only chemical being used for dissolving cobalt-58 CRUD activity. The licensee plans to maintain the RCS temperature at 190 degrees fahrenheit, and operate the RCS purification system in through the ion exchange bed at the maximum flowrate during the Chem-Decon. The inspector noted that the licensee was not using boration in their Chem-Decon process. After examining data from the 1992 Unit 2 and 3 Chem-Decons, the inspector concluded that the licensee's basis for their Chem-Decon method was sound. The inspector also noted from the previous Chem-Decons that ALARA and HP groups recorded very little radiation survey data. The licensee said that they were planning to collect more radiation data during the U2C7 Chem-Decon so that ALARA engineering could better track the radiation field reduction results. The inspector had no further concerns in this area.

(b) Radiation Hot Spot Flushes

The inspector examined pre/post radiation hot spot flush data sheet that was being used for tracking the progress of the hot spot flush program in Unit 3. This data sheet consisted of 23 identified hot spots in four plant systems. Several of the contact dose rates were in excess of 10 rem/hour, and one was 70 rem/hr. The inspector attended the pre-job HP tailboard meeting for flushing the 70 rem/hr hot spot in Unit 3 on a RCS valve weld, and a 2.1 rem/hr hot spot on a safety injection system valve. The inspector reviewed the hot spot flush procedure, radiation surveys, REPs, and the Tailboard Check Sheets. On May 4, 1993, the licensee attempted to flush the 70 rem/hr hot spot, but was unsuccessful in lowering that dose rate. The inspector found that the planning and implementation of this hot spot flush effort was thorough. The licensee was successful in reducing the dose rates associated with 2.1 rem/hr hot spot, however, they were planning to cut out the RCS valve weld with the 70 rem/hr hot spot. Out of the 23 hot spots identified in Unit 3 the licensee successfully flushed and lowered the dose rates in 13 cases so far in 1993. The inspector had no further concerns in this area.

(c) Cobalt Reduction

Discussions were held with the ALARA engineering group on the licensee's efforts to reduce cobalt bearing materials during plant maintenance and design changes because, a number of the radiation field and hot spot problems were related to valve welds and materials. The inspector reviewed a licensee letter dated December 18, 1992, on performing material substitution equivalency evaluations for all valves in Units 2 and 3 that contain cobalt and nickel. In the letter the licensee gave priority to valves that interfaced with the RCS and were frequently operated which caused cobalt-58 and 60 to be spread through the plant. The letter requested that the SONGS material procurement department establish a screening process for all purchases related to cobalt bearing valves. It was also noted that the licensee has procedures for evaluating cobalt bearing valves. The inspector had no further concerns in this area.

(2) Radwaste Minimization

Discussions were held with the supervising project engineer for the Radioactive and Mixed Waste Minimization (RMWM)

department about some of the programs that were being implemented at SONGS. The inspector reviewed RMWM program enhancements in the following areas:

- * Radwaste Administration: revised the RMWM procedure, and created a RMWM technician position for setting goals, tracking, and reporting RMWM progress.
- * RMWM Training: included RMWM worker awareness and practices training.
- * HP Field Elements: included reducing contaminated areas, and using launderable bags, rags and mopheads.
- * Plant Elements: which included reducing chemistry laboratory waste and the use of wood in the RCA, and implementing the "Clean is Green" and dry active waste sorting programs.
- * Liquid Radwaste (LRW) Processing: which included LRW optimization in operations interfaces, sump cleaning, filter, and resin usage.

The licensee had set a goal to reduce solid radwaste (SRW) shipments for burial from 10,000 cubic feet(cuft) to 3,000 cuft for 1993. At the time of this inspection only 1 cuft of SRW had been shipped for burial. In 1993 SONGS was restricted to burying SRW at the Barnwell, South Carolina facility, and as a result, SONGS has contracted more radwaste process services for radwaste reduction. In addition, the licensee established the RMWM department, its programs, and the ability to store five years of SRW at their interim waste storage facility.

The inspector concluded that the licensee's efforts in radwaste management were appropriate. The inspector had no concerns in this area.

e. Internal and External Exposure Control

(1) Occupational Exposure Records

The inspector requested personnel radiation records of an individual who worked for SONGS in 1982 and 1983. The licensee is required to maintain personnel radiation exposure records of all individuals who entered radiation control areas (RCAs) in accordance with 10 CFR 20.401 and Technical Specification (TS) 6.10.1. As requested by the inspector, the licensee provided the following records on the individual:

- * NRC Form-5s
- * Termination Reports
- * Whole Body Count (WBC) Internal Exposure Records
- * Film Badge External Dosimetry Records
- * Occupational Exposure History
- * Respiratory Physical Examination Records
- * Training Records

The above list represented the individual's occupational external/internal exposure history, and training/physical qualifications while at SONGS. The inspector noted that the individual worked at SONGS during two periods between August 1982 and January 1983. The individual's external dosimetry detected no radiation exposure, and the internal WBC exposure only detected naturally occurring radioactive potassium. External and internal radiation exposure records of other SONGS workers of that same period were reviewed by the inspector. The inspector found nothing in the licensee's exposure records that indicated any concerns with the validity and completeness of those records.

The inspector concluded that the licensee's retention of personnel exposure records satisfactorily met the requirements of 10 CFR 20.401 and TS 6.10.1. The inspector had no further concerns in this area.

(2) Personnel Dosimetry and Monitoring Enhancements

The inspector examined enhancements made to licensee personnel dosimetry and monitoring programs, and held discussions with responsible HP staff. Program enhancements were made as follows:

(a) Alarming Dosimeters

As of April 1993 SONGS implemented two enhancements to the alarming dosimeter program. Analog type personal/self indicating chamber dosimeters (PICs or SIDs) were replaced by alarming personal dosimeters referred to as PD-1s. The PD-1 dosimeters along with its PD-1 personnel exposure reader system automatically updates and tracks personnel exposures. The licensee required all personnel to view a training video on using the PD-1 system, and denied access to radiologically controlled areas of personnel who had not viewed the PD-1 video. The inspector viewed the PD-1 video and found that it adequately demonstrated the use of the PD-1.

The licensee identified a recent change to PD-1 operations. HP supervision had stopped the practice of inserting PD-1s into plastic bags, because of

concerns that the alarming sound was reduced. The inspector examined test results of a licensee study that measured the noise output of PD-1s under a number of conditions, including placement into a plastic bag. The results of the test showed that a plastic bag had little affect on the noise output of an alarming dosimeter. The inspector concluded that the PD-1 noise study was adequate.

(b) Thermoluminescent Dosimetry (TLD) Program

The licensee upgraded its TLD computer software and hardware, because the vendor of the old system no longer supported the parts which contained TLD element correction factors (ECFs). HP management stated that, "The antiquated hardware was a liability to NRC regulations under 10 CFR 20.202 and to our National Voluntary Laboratory Accreditation Program (NVLAP) certification." Discussions were held between the inspector, dosimetry staff, and nuclear information systems (NIS) personnel. The licensee's TLD computer upgrade was designed, developed, implemented, and tested (computer software verification & validation) in March 1993. The inspector examined TLD procedure change, and observed operational testing of the TLD system upgrade by dosimetry and NIS personnel. Operational testing involved HP exposing a number of TLDs to 50 millirem of radiation, and processing the TLD with the upgraded system. Based on the results of the testing, the upgraded TLD system was declared operational. The inspector reviewed a TLD system upgrade schedule, which included activities such as procedure changes, training, and more upgrades. The inspector concluded that the licensee's TLD upgrade activities were adequate.

HP management informed the inspector that the dosimetry program, as of May 1993, will no longer process personnel TLDs on a monthly basis but on a quarterly basis instead. The inspector had no concerns with this change in the licensee's dosimetry program.

(c) Installed Personnel Monitors (IPM-8s)

In August 1992 the HP division placed into service installed personnel contamination monitors (IPM-8). The HP instrumentation department (HPI) informed the inspector that they were reducing the IPM-8 contamination counting times from 15 seconds to 10 seconds. The inspector examined licensee IPM-8 data that supported the proposed change against regulatory

seconds. The inspector examined licensee IPM-8 data that supported the proposed change against regulatory guidance NRC Inspection & Enforcement Circular (IEC) 81-07 and Information Notice (IN) 85-92, industry standards, and licensee procedure S0123-VII-6.5.8 on IPM-8 operations. Discussions were held between the inspector, HPI supervisor, and the HP operations support manager about the proposed IPM-8 operational changes and the IPM-8 data. Based on the inspector's review of the data and discussions, the inspector had no regulatory concerns in this area. The licensee's IPM-8 operations were adequate.

f. Facility Tours

The inspector performed independent radiation measurements during Units 2 and 3 operations. These measurements were taken with an NRC ion chamber survey instrument (Serial No. 8985, calibration due September 12, 1993). The inspector noted that radiation postings were conspicuous and alerted workers to the area radiological conditions. The inspector toured radwaste storage areas, and noted that packaged radwaste containers were positioned to minimize area dose rates.

The inspector concluded that the licensee's ALARA program was capable of meeting its safety objectives during the U2C7 refueling outage. No violations or deviations were identified.

4. Exit Meeting

The inspector met with the licensee representatives denoted in Section 1 at the conclusion of the inspection on May 7, 1993. The scope and findings of the inspection were summarized. No violations or deviations were identified.