

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

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50-362

License Nos.: NPF-10  
NPF-15

Report No.: 50-361/97-13  
50-362/97-13

Licensee: Southern California Edison Co.

Facility: San Onofre Nuclear Generating Station, Units 2 and 3

Location: 5000 S. Pacific Coast Hwy.  
San Clemente, California

Dates: June 9-13, 1997

Inspector: L. T. Ricketson, P.E., Senior Radiation Specialist  
Plant Support Branch

Approved By: Blaine Murray, Chief, Plant Support Branch,  
Division of Reactor Safety

ATTACHMENT: Supplemental Information

## EXECUTIVE SUMMARY

San Onofre Nuclear Generating Station, Units 2 and 3  
NRC Inspection Report 50-361/97-13; 50-362/97-13

This announced, routine inspection reviewed the program to maintain occupational exposures as low as is reasonably achievable (ALARA), training and qualifications of members of the radiation protection organization, and quality oversight of the radiation protection program.

### Plant Support

- The ALARA program was comprehensive and effective. The licensee's three-year collective radiation exposure for 1994-1996 was below the national average (Section R1).
- Noteworthy initiatives indicated good management support for the ALARA concept.
- A minor concern was identified related to the ALARA program. The system used by the licensee of perpetuating knowledge of dose saving measures did not work consistently. Viable lessons learned were not always implemented during subsequent outages (Section R1).
- The licensee had a highly qualified technical staff (Section R5).
- An effective training program was implemented for radiation protection technicians, but the number of radiation protection technicians registered by the National Registry of Radiation Protection Technologist was average. (Section R5).
- Management oversight of radiation protection activities was good. Observations by the Nuclear Oversight Division were frequent and diverse (Section R7).
- The radiation protection group performed frequent self-assessments and did a good job of analyzing the information from the self-assessments and other management oversight activities (Section R7).
- Overall, appropriate corrective actions were implemented to address assessment findings. However, this was primarily because of the initiative of the individuals involved rather than the existence of a formalized system for assigning responsibilities and ensuring that the corrective actions were implemented (Section R7).

Report Details

IV. Plant Support

**R1 Radiological Protection and Chemistry Controls**

**R1.1 ALARA**

a. Inspection Scope (83750)

- Person-rem totals
- ALARA initiatives
- Hot spot tracking and removal results
- ALARA Post Job Reviews

b. Observations and Findings

The licensee's person-rem totals for 1994-1996 are listed below. The licensee's three-year average for this period (101 person-rem) was below the most recent, available industry averages. This was accomplished despite the fact that the licensee continued to conduct refueling outages that were relatively long when compared to current industry practice. The licensee's goal for 1997 is 300 person-rem. The totals and goals are based on thermoluminescent dosimeter results.

TOTAL RADIATION EXPOSURE (in Person-rem)

	1994	1995	1996
Site total/Unit Average	32/16	447/223.5	129/64.5
National PWR Average	131	170	Not yet available

The licensee undertook or maintained noteworthy dose reduction initiatives during the assessment period. (The current assessment period is December 31, 1995 through July 5, 1997.) One of these was the use of a unique combination of television cameras, teledosimetry, and cellular communications equipment known as CARE, containment application for reducing exposure. The equipment enabled radiation protection personnel to observe workers and monitor radiation exposure of selected individuals involved in potentially high-dose work activities without the radiation protection personnel receiving additional, unnecessary dose. Another initiative that resulted in significant dose-savings was the use of micropore filtration on the chemical volume control system. The filters were installed specifically to reduce source term and indicated management's support for the ALARA concept.

The licensee added another element to the ALARA program. A formalized program for tracking and removing hot spots was implemented.

The inspector attended a post-job review meeting. Individuals from different plant disciplines identified and discussed lessons learned during primary-side steam generator work. The meeting was conducted in an orderly manner and the licensee accomplished its stated purpose of identifying ways to reduce radiation exposure when similar work activities were performed. In reviewing records of similar post-job reviews, the inspector identified one minor concern related to the ALARA program. The inspector found by random verification that the licensee's current process did not ensure that lessons identified as viable were implemented during subsequent outages. Licensee representatives acknowledged that this area of the program deserved additional attention and stated that they would evaluate the use of the site-wide action request system to ensure that lessons learned were perpetuated.

c. Conclusions

The ALARA program was comprehensive and effective. The licensee's three-year collective radiation exposure for 1994-1996 was below the national average. Noteworthy initiatives indicated good management support for the ALARA concept. The system used by the licensee of perpetuating knowledge of dose saving measures did not work consistently. Viable lessons learned were not necessarily implemented during subsequent outages.

**R5 Staff Training and Qualification**

a. Inspection Scope (83750)

The inspector interviewed the technical training supervisor and a radiation protection technician instructor and reviewed the following:

- Radiation protection technician continuing training topics
- Training procedures listed in the attachment to this report
- Instructor qualifications
- Class attendance
- Examination results
- Training resources
- Personnel qualifications

b. Observations and Findings

Formal committee meetings were conducted to determine appropriate training topics. Topics presented during the assessment period included current events, lessons learned, and information on selected plant systems. The inspector concluded that the topics met the procedural guidance in Procedure SO123-XXI-1.11.2, "Health Physics Personnel Training Program Description," Revision 2.

Four instructors were assigned to radiation protection technician training during the present assessment period. All instructors had at least five years instructing experience. All but one had practical radiation protection experience. The other individual had experience teaching math and science. Because of his skills in these areas, the individual was utilized as the primary instructor of health physics fundamentals.

Through a review of event reports and radiological observation reports, as well as interviews with training personnel, the inspector determined that training deficiencies had not been identified as the root cause of identified problems. Therefore, the inspector concluded that an effective training program for radiation protection technicians was implemented.

There were 13 people in the licensee's site and corporate radiation protection organization that were certified as health physicists by the American Board of Health Physics. There were 18 people with advanced degrees and a high number of individuals had bachelors degrees or were attending degree completion programs. Most of these individuals were supervisors or part of the professional staff.

Of the radiation protection technicians, 30 individuals, or approximately half, were registered by the National Registry of Radiation Protection Technologists.

c. Conclusions

The licensee had a highly qualified technical staff. An effective training program was implemented for radiation protection technicians, but the number of radiation protection technicians registered by the National Registry of Radiation Protection Technologist was average.

**R6 Radiological Protection and Chemistry Organization and Administration**

There was a slight reduction in staffing in the radiation protection organization during the assessment period. Staffing declined from 145 to 127. The inspector identified no evidence that the staff reduction compromised safety.

**R7 Quality Assurance in Radiological Protection and Chemistry Activities**

a. Inspection Scope (83750)

- Quality leadership observations
- Leadership observations
- Event requests
- Radiological observation reports
- Internal audits
- Independent audits
- Event trending and analysis

b. Observations and Findings

The licensee used all methods listed above to identify problem areas. Members of the nuclear oversight division performed "Quality Leadership Observations." These observations were generally of work activities in progress. The inspector reviewed examples of the observation reports and concluded that the observations were frequent and the subjects of the observations were diverse enough to provide a comprehensive review of radiation protection activities. Nuclear overview division personnel performing the observations had practical health physics experience. The level of experience of these individuals has been evaluated previously by NRC inspectors and was determined appropriate.

Health physics personnel performed a large number of observations within the radiological controlled area. They also performed a relatively high number of internal audits. From February 12, 1996, to May 28, 1997, health physics professionals performed 12 internal audits of various areas of the program. Additionally, there were two audits by independent contractors. When combined with event reports and radiological observation reports, the observations and audits formed a good basis for self-assessment.

The health physics division did an excellent job of trending and analyzing information received from observations and audits. More than one analysis technique was used. Event analysis provided radiation protection management with information about areas of the program that needed additional attention. The analysis of failed barriers and causal codes furnished information to formulate corrective actions.

The licensee demonstrated a good ability to be self-critical and identify problem areas. In the examples reviewed, the licensee also implemented appropriate corrective actions to address the identified problems. However, the inspector noted, that a formal process was not used when assigning responsibilities to individuals for the implementation of corrective actions. An independent audit, documented in a December 1996 report, illustrated this. The audit identified several problem areas and licensee representatives stated that corrective actions were



taken, but they could not demonstrate the method used to assign the responsibilities for implementing corrective actions. The inspector concluded that the successful implementation of corrective actions occurred because of the personal initiative of the people involved and not because a formal system of documentation and tracking was used to ensure implementation. Health physics personnel acknowledged the inspector's observation and stated that use of the site-wide action request system was a possible solution to this concern.

c. Conclusions

Management oversight of radiation protection activities was good. Observations by the nuclear oversight division were frequent and diverse.

The radiation protection group performed frequent self-assessments and did a good job of analyzing the information from the self-assessments and other management oversight activities. Overall, appropriate corrective actions were implemented to address assessment findings. However, this was primarily because of the initiative of the individuals involved rather than the existence of a formalized system for assigning responsibilities and ensuring that the corrective actions were implemented.

V. Management Meetings

**X1 Exit Meeting Summary**

The inspector presented the inspection results to members of licensee management at an exit meeting on June 13, 1997. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

E. Bennet, Nuclear Auditor  
D. Cox, Compliance Engineer  
R. Krieger, Vice President, Nuclear Generation  
M. Lewis, ALARA Engineer  
J. Madigan, Acting Health Physics Manager  
S. Schofield, Health Physics Supervisor  
S. Stenson, Radiation Protection Technician Instructor  
H. Wood, Nuclear Auditor  
R. Wood, Nuclear Training Supervisor

NRC

J. Kramer, Resident Inspector  
J. Russell, Resident Inspector  
J. Sloan, Senior Resident Inspector

INSPECTION PROCEDURES USED

83750 Occupational Radiation Exposure

LIST OF DOCUMENTS REVIEWED

Documents Reviewed

Health Physics Division Organization Chart - June 1, 1997

1996 Annual Radiation Protection Summary Report

1997 First Quarter Health Physics Division Assessment

Station Performance Report, Fourth Quarter 1996

Station Performance Report, First Quarter 1997

Health Physics Leadership Observation Program Summary - First Quarter 1997

Health Physics Event Analysis Trending Report - First Quarter 1997

Health Physics Annunciator Panel, Second Quarter 1996 - First Quarter 1997

Human Performance Trending - Health Physics Division - First Quarter 1997

Independent Health Physics Review - December 2-6, 1996

Worker Knowledge of Radiological Conditions Audit - May 28, 1997



RCA Entry Ticket Audit - April 10, 1997  
RCA Entry Ticket Followup Audit - April 30, 1997  
Pre-job Meeting Audit - March 21, 1997  
Compiled List of Health Physics Audits - January 1996 through July 1997  
Selected Quality Leadership Observations  
Radiological Observations Reports (January through May 1997)

ALARA Job Review Record - Primary Steam Generator Work - U2C9  
ALARA Job Review Record - Primary Steam Generator Work - U3C9

Procedures

SO123-VII-20.4, "SONGS ALARA Program," Revision 0  
SO123-VII-20.4.3, "ALARA Job Reviews," Revision 1  
SO123-XXI-1.11.2, "Health Physics Personnel Training Program Description," Revision 2