U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 50-206/80-22

Docket No. 50-206 License No. DPR-13 Safeguards Group

Licensee: Southern California Edison Company

2244 Walnut Grove Avenue

Rosemead, California 91770

Facility Name: San Onofre Unit 1 (SONGS-1)

Inspection at: Camp Pendleton, California

Inspection conducted: July 8-10, 1980

Inspectors: F. A. Wenslawski 8/19/80
for J. R. Curtis, Radiation Specialist — Date Signed

F. A. Wenslawski 8/19/80
F. A. Wenslawski, Chief, Reactor Radiation Safety Section — Date Signed

Date Signed

Approved By: H. E. Book 8/20/80
H. E. Book, Chief, Fuel Facility and Materials Safety Section — Date Signed

Summary:

Inspection on July 8-10, 1980 - Report No. 50-206/80-22

A special inspection was conducted to determine the circumstances and events that resulted in the apparent exposure of an individual employed at the SONGS-1 site in excess of the limits of 10 CFR 20.101(b)(1). Pertinent records were examined and licensee representatives were interviewed with regard to the activities and circumstances that led to the determination of the apparent exposure of the individual in excess of regulatory limits. The inspection involved 47 hours on-site by two inspectors.

Results: As a result of this inspection one item of noncompliance with the SONGS-1 Technical Specification (T.S. 6.11), and two items of noncompliance with 10 CFR 20, (20.101(b)(1) and 20.201(b)) were identified. These are discussed in the "Details" section of this report, Part 3, Inspection Findings (a), (b), (c).

DETAILS

1. Persons Contacted

*E. Morgan, Acting Plant Manager
*R. Brunet, Superintendent SONGS Unit 1
*R. Warnock, Supervisor of Plant Chem-Rad Protection
*S. Meddling, Chem-Rad Protection Engineer
G. Peckham, Chem-Rad Protection Engineer
J. Mortenson, Chem-Rad Protection Engineer
J. Scott, Chem-Rad Protection Technician
*G. Mac Donald, SCE Quality Assurance Supervisor Unit 1

*Indicates presence at the exit interview.

2. Background and Circumstances Leading to Apparent Exposure in Excess of Limits

Preliminary information regarding the apparent exposure in excess of regulatory limits was reported to the regional office on June 19, 1980 by the Resident Inspector. The status of the licensee's investigative activities and updates were made available by telephone contact with the licensee staff and their report, as required by 10CFR 20.405, was received in the Region V Office on July 16, 1980.

The SONGS-1 plant has been in a refueling and upgrade outage since early April. Unpredictable changes in the scope of planned projects and other reactive effort altered the extent of the outage and precipitated a significant increase in the on-site work force beyond the expected levels. This increase impacted on radiation protection activities such as orientation and training, procurement and issuance of personnel dosimetry devices and the processing of dosimetric data to the point where implementation of certain procedures was not thorough or, in some cases, timely.

The licensee utilizes three personnel dosimeter devices in its program. Self-reading dosimeters are issued upon entry to controlled areas and the resulting personnel dose measurements are reported and entered into the individual's record on a daily or per-entry basis. Thermoluminescent dosimeters (TLD's) are issued and are normally exchanged on monthly schedule, the same schedule as the third type of device, the film badge dosimeter, provided by the Landauer Company. The TLD's are processed at the licensee's facility and have been provided as a back-up dosimeter to be processed for unofficial dose data at the licensee's discretion in cases where there is evidence of lost or damaged film, or for rapid evaluation of exposure in cases of off-scale self-reading dosimeters. The Landauer film badge is issued to all persons who might enter radiation areas on a regular basis and is designated by the licensee as the dosimetric device used to generate personnel exposure data for the official record.

The licensee has a sophisticated computer-based system of compiling individual dosimetric data for exposure control on a quarterly basis. The system relies on a combination of the sum of the monthly film badge results in the quarter to date, plus the running daily totals of the self-reading dosimeter data for the period not covered by the film badge data. The individual's exposure record is then made available via computer terminals at the access control points where his access to controlled areas and resultant radiation exposure is controlled based on his cumulative exposure to date.

In this case the apparent exposure in excess of limits occurred when self reading dosimeter values were summed over an extended period and used as the only basis for access/exposure control. When film badge data was made available for the individual, the results were considerably higher than the self reading dosimeter data and the official dosimetric record indicated an exposure in excess of the quarterly limit in 10 CFR 20.101b.

A systematic comparison of the monthly values for self reader, TLD and film badge dosimetric results is made by a computer routine at SCE but it identifies the cases in which the film badge value is lower than the self-reader or TLD value by greater than 20%. This comparison, initiated by the licensee, was designed to identify discrepancies for review and evaluation when the film badge data, which is designated as the official dosimetric value, is lower than the other dosimeter values and if entered without review, might be non-conservative as a monthly dose evaluation.

Other, non-routine comparisons of the results from self-reading dosimeters and film badges had been performed in the past. In these previous comparisons, licensee representatives reported that the self-reading dosimeter values were generally within twenty percent of the film badge readings and were generally characterized as higher than the film badge results. This previous and expected condition was a basis for accepting the self-reading dosimetric data over the extended period as a conservative value.

Inspectors review of a limited sample of available data for the April through June 1980 period did not support the contention that the self-reading dosimeter values were consistently higher. (See Section 4 Exit Interview)

3. Inspection Findings

The inspectors discussed licensee action with regard to the determination of the exposure in excess of limits with members of the licensee's management, interviewed members of the Chemical/Radiation Protection staff, examined training, qualification, dosimetric and work permit records related to the individual whose reported exposure exceeded the regulatory limits. This individual is identified as "A" in this report.

a. Failure to Perform Adequate Surveys as Defined in 10 CFR 20.201(b)

For the reported case of exposure in excess of 3 Rem per quarter limit, unusual delays in the exchange of film badge dosimeters and the processing and recording of resultant personnel monitoring data occurred. This resulted in continued reliance on individual "A"s personnel exposure data as generated by summing the daily self reading dosimeter results over an extended period.

The first delay occurred when the shipment of exchange film badges for the April 30th exchange, identified as the April 80 exchange, was misdirected to the SCE warehouse rather than being delivered to the radiation protection staff member, as is the normal routine. The staff, under the pressure of processing personnel and supplying dosimeters to the continually increasing on-site work force, contacted the supplier regarding the missing badges, ordered extra badges and attempted to trace the misplaced shipment. This activity resulted in a delay of exchanging the April film badges for some 10 days. They were exchanged on May 10, 1980, prepared for shipment and finally shipped to the film processor, Landauer, on May 17, 1980. According to the licensee, the late arrival of the April badges at the processing center in Illinois resulted in additional delays all along the process stream, because other customers were already in the stream when the SONGS film arrived

The May 80 film badge exchange was performed on schedule on June 1, 1980. Licensee radiation protection staff, in response to their concern over the delays to date, arranged to have one hundred of the May 80 badges, including individual "a"s, sent to the processor's Los Angeles office for special priority processing. The badges were sent, processed, and the results were reported to SONGS on June 4, 1980. The results were reviewed but were not entered into the computer system for updating individual exposure records immediately.

In the period May 17 to June 2, 1980 the April 80 film badges were processed but, contrary to the processors agreement, exposures in excess of 400 millirem were not called in to SONGS. The April 80 film badge results were received at SONGS on June 9th. On June 13 and 16th the April 80 and May 80 film badge data respectively, including individual "A"s, were entered into the computer system. The resultant accumulated dose for individual "A", with the April and May film data added to the June dosimeter readings to date exceeded the limits specified in 10 CFR 20.101(b)(1).

Emergency processing of "A"s June 80 film badge was ordered and the results confirmed that the summary of film badge data for April, May and June 1980 for individual "A" had exceeded the limit, and totaled 3.5 rem. The licensee's "informal" TLD results for the same period was 2920 millirem.

The various delays encountered in the April-May period resulted in the failure to adequately evaluate and control the exposure of individual "A" and constitutes non-compliance with 10 CFR 20.201(b). "Each licensee shall make or cause to be made such surveys as may be necessary for him to comply with the regulations of this part". (OI 80-22-01)

b. Exposure Exceeding the Limits of 10 CFR 20.201(b)(1)

When the film badge data for first two months of the quarter (April and May 1980), were entered in the individual's record, large discrepancies between it and the lower self-reading dosimetric record were noted. The individual's exposure, based on the official dosimetric record, had exceeded the licensee's normal administrative control level of 1800 millirem per quarter. The licensee took appropriate action when the official personnel exposure data was entered and was found to have exceeded their control limits. However, at that time the individual had accumulated additional exposure in the course of his duties and his apparent exposure of 3.5 Rem, in excess of limits, was reported. A chronological listing of the dosimetry values for individual "A" with notations concerning the availability of film badge data and its incorporation into the official compilation is presented below to summarize the sequence of entries and present some time frame in which exposure in excess of limits was accumulated.

EXPOSURE SUMMARY FOR INDIVIDUAL "A"

Date of Birth: 1-7-55

DATE	SELF-READING DOSIMETER	FILM BADGE	ASSIGNED DOSE IN DAILY REPORT	COMMENTS
April 30	685	-	685	Request to raise dose limit for "A" from 900 to 1800 mrem processed May 14, 1980.
May 31	650	-	1335	
June 1	80	-	1415	
2	0	-	1415	April film data available at Landauer, no call on persons 400mr.
3	0	-	1415	
4	10	-	1425	
5	0	-	1425	Received data from specially processed May films, 1370mr for individual "A".
6	30	-	1455	
7	250	-	1705	
8	50	-	1755	
9	10	-	1765	Received April film data from Landauer, 1350mr for individual "A".
10	0	-	1765	
11	0	-	1765	
12	0	-	1765	
13	0	-	1765	April film data entered into computer.
14	0	1350	2430	
15	0	-	2430	"A" left site.
16	0	1370	3150	May film data entered into computer, 1370mr for individual "A".
16	0	780	3500	Emergency June film processing for individual "A" gave 780mr, resulting in total reported exposure of 3.5 rem in the second quarter of 1980.

These findings are considered to constitute non-compliance with parts 20.101(b)(1) regarding limitation of exposure of individuals in restricted areas. 10 CFR 20.101(b)(1) states "A licensee may permit an individual in a restricted area to receive a total occupational dose to the whole body greater than that permitted under paragraph (a) of this section, provided: (1) During any calendar quarter the total occupational dose to the whole body shall not exceed 3 rems..."

c. Other Findings

Training and qualification records of "A" indicated that he had received training for Qualified Escort Status, had been tested and qualified during a previous outage and, for work during this outage, had attended requalification training, and been tested and requalified in a timely manner.

Personnel exposure history and previous exposure summaries for "A" were on file. Computerized data related to the radiation exposure of "A" appeared to be in order to the extent that his reported quarterly exposure had been updated with the daily self-reading dosimeter information generated at the access control points in a timely manner. A request to extend "A"s exposure beyond the licensee's lower administrative limit of 900 mRem was processed according to existing procedures.

Individual "A" had worked on a variety of tasks in the generally low radiation level work areas inside containment and outside on the operating deck, and in higher radiation areas in the reactor vessel cavity. Tasks performed as described on Radiation Exposure Permits ranged from preparing and decontaminating special tools used in the refueling process to removing, cleaning, and installing studs and seals for the top of the reactor pressure vessel. Individual "A" worked at the SONGS 1 Site during the period from April 11 to June 15, 1980. Examination of the Radiation Exposure Permits on which "A" was listed indicated general area radiation levels in the range of 5 to 200 mR per hour and hot spots of limited access up to 500 mR/hr. Self-reading dosimeter information was retrieved and indicated dose assignments of 0 to 250 mRem per entry. The time periods from entrance to exit beyond the control point was reported and these periods ranged from one-half hour to five hours. Since assignments among the work group in which "A" was working varied, assessment of the accuracy or appropriateness of the self-reading dosimeter measurements was not possible.

During the course of this inspection, several knowledgeable licensee personnel informed the inspectors that on many occasions during the period from mid-April to mid-June 1980, individuals read and reported their own self-reading dosimeter results when exiting control points.

A radiation protection technician, in response to licensee management's "in-house" inquiry into the cause of the large descrepancies between individuals self reading dosimeter summary and film badge results, reported that he had been in a conversation with individual "A" some time in the period between mid-May and June 7th in which individual "A" indicated that there were times when he exited from controlled or exclusion areas and reported his self reading dosimeter reading as zero without looking at it, when he felt that he had not picked up anything.

As of the time of this report, the inspector has not been successful in contacting individual "A" and pursuing this and other relevant questions.

Radiation Protection Procedure VII 1.5 Access to Controlled and Exclusion Areas Rev. 3, January 1979 Part III E, 3 states: "A pocket dosimeter will be issued and read by the Exclusion Area Monitor prior to each person's entry into the main controlled area. The dosimeter will be returned to and read by the monitor when the person leaves the Controlled Area..."

Failure to follow this procedure was considered non-compliance with Technical Specification 6.11, which requires the preparation of written procedures for personnel radiation protection and adherence to these procedures for all operations involving radiation exposure. (OI 80-22-03)

In discussions with knowledgeable licensee personnel, the inspectors were also informed that on many occasions during the peak of the outage that the licensee had inadequate supplies of low range self-reading pocket dosimeters. Radiation Protection Procedure S-VII-1.19, Rev. 2, January 10, 1979 specifies in Part III.A.4 that "the range of the dosimeter issued (0-500 mR, 1R, 5R) shall be appropriate for the conditions." Radiation protection personnel disclosed that they had commonly ran out of 0-500 mr dosimeters and issued 0-1 r range instead and that this occurred in spite of specific efforts to acquire adequate supplies. In conversation with the inspectors, licensee personnel acknowledged that a 0-1 r range dosimeter is not appropriate in most instances. It could not be determined whether this situation had any bearing on the personnel overexposure. The matter is not considered to be noncompliance.

4. Exit Interview

An exit interview was held following the inspection at which licensee representatives were advised of the specific areas of non-compliance and other findings indicated by the inspection. Licensee management

and staff pointed out that considerable attention and effort had been devoted to the subject of this inspection, and pointed out that, since the overexposure had been identified and possible contributing causes had been established, extensive reorganization of the Radiation Protection staff was made and corrective action had been taken to overcome procedural inadequacies.

The licensee representatives agreed to undertake a systematic comparison of pocket dosimeter readings with film badge assignments.