



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION V

1450 MARIA LANE, SUITE 210  
WALNUT CREEK, CALIFORNIA 94596-5368

MAY 2 1989

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NUCLEAR LICENSING

Docket Nos. 50-206, 50-361 and 50-362

Southern California Edison Company  
P. O. Box 800  
2244 Walnut Grove Avenue  
Rosemead, California 91770

Attention: Mr. Kenneth P. Baskin, Vice President ✓  
Nuclear Engineering, Safety and Licensing Department

Gentlemen:

SUBJECT: NRC INSPECTION SAN ONOFRE UNITS 1, 2 AND 3

This letter refers to the inspection conducted by Mr. J. E. Russell of this office on March 13 through 23 at the San Onofre site and telephone conversations and document reviews through April 3, 1989, of activities authorized by NRC License Nos. DPR-13, NPF-10 and NPF-15 and to the discussion of our findings held by Mr. Russell with Messrs. C. McCarthy and H. Morgan and other members of your staff at the conclusion of the on-site inspection.

Areas examined during this inspection are described in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

Based on the results of this inspection, it appears that one of your activities were not conducted in full compliance with NRC requirements as set forth in the Notice of Violation enclosed herewith as Appendix A.

The enclosed inspection report is worthy of your careful review. The report describes too many examples involving inadequate control of radioactive material. While the NRC enforcement policy encourages licensees to identify and correct deficiencies in their performance we also expect these corrective actions to be lasting and effective. Your performance in the radiological controls area as described in this inspection report is not reflective of SALP Category 1 performance.

Your response to this Notice is to be submitted in accordance with the provisions of 10 CFR 2.201 as stated in Appendix A.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosure will be placed in the NRC Public Document Room.

The response directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

MAY 2 1989

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely,



Gregory P. Yuhas, Chief  
Emergency Preparedness and  
Radiological Protection Branch

Enclosures:

- A. Appendix A (Notice of Violation)
- B. Inspection Report Nos. 50-206/89-08, 50-361/89-08 and 50-362/89-08

cc w/enclosures:

- D. J. Fogarty, SCE
  - C. B. McCarthy, SCE (San Clemente)
  - H. E. Morgan, SCE (San Clemente)
- State of CA

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APPENDIX A

NOTICE OF VIOLATION

Southern California Edison Company  
San Onofre Nuclear Generating Station  
Units 1

Docket Nos. 50-206  
License Nos. DPR-13

During an inspection conducted on March 13 through April 3, 1989, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1988) as modified by 53 Federal Register 40019 (October 13, 1988), the violation is listed below:

10 CFR 19.12, Instructions to workers, reads in part:

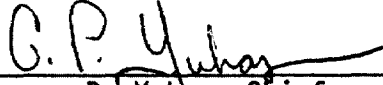
"All individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage, transfer, or use of radioactive materials or of radiation in such portions of the restricted area,..., in precautions or procedures to minimize exposure...The extent of these instructions shall be commensurate with potential radiological health protection problems in the restricted area."

Contrary to the above, on December 22, 1988, a worker was not informed of the storage of radioactive material and the radiation levels in a portion of the Steam Generator "A" platform and was not instructed in the precautions and procedures necessary to minimize his exposure. As a result, the worker received an unplanned exposure to his left arm of approximately 1600 mrem.

This is a Severity Level IV violation (Supplement IV).

Pursuant to the provisions of 10 CFR 2.201, Southern California Edison Company is hereby required to submit a written statement of explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 with a copy to the Regional Administrator, Region V, and a copy to the NRC Resident Inspector, within 30 days of the date of the letter transmitting this Notice. This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation if admitted, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. If an adequate reply is not received within the time specified in this Notice, an order may be issued to show cause why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown.

FOR THE NUCLEAR REGULATORY COMMISSION

  
\_\_\_\_\_  
Gregory P. Yuhas, Chief  
Emergency Preparedness and  
Radiological Protection Branch

Dated at Walnut Creek, California  
this 5th day of may 1989

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-206/89-08, 50-361/89-08 and 50-362/89-08

License Nos. DPR-13, NPF-10 and NPF-15

Licensee: Southern California Edison Company  
2244 Walnut Grove Avenue  
Rosemead, California 91770

Facility Name: San Onofre Nuclear Generating Station - Units 1, 2 and 3

Inspection at: San Onofre Nuclear Generating Station

Inspection conducted: March 13 through 23, 1989, at the San Onofre site and  
telephone calls and correspondence through April 3,  
1989, at the Region V office.

Inspector: J. Russell 5-2-89  
J. Russell, Radiation Specialist Date Signed

Approved by: E. Garcia May 2, 1989  
E. Garcia, Acting Chief Date Signed  
Facilities Radiological Protection Section

Summary:

a. Areas Inspected:

This was a routine, unannounced inspection covering the followup of open items, in-office review of periodic and special reports, shipping of low-level wastes for disposal and transportation, radioactive waste management, transshipment of Unit 1 fuel to Units 2/3, and transportation activities. The inspection included tours of the licensee's facilities. Inspection procedures 92701, 90713, 83750, 84850, 86721, 86740 and 30703 were covered.

b. Results:

In the areas inspected, the licensee's programs appeared adequate to the accomplishment of their safety objectives. However, weakness was exhibited during the followup of open items in that a violation was identified in the area of occupational exposure control. An unresolved item involving the review and approval of work documents was also identified. Non-cited violations (NCVs) were also identified involving the control of radioactive material, dose rates in unrestricted areas and the control of hot particles. All the above noted deficiencies are detailed in paragraph 2.

## DETAILS

### 1. Persons Contacted

#### Licensee Personnel

C. McCarthy, Vice President and Site Manager  
H. Morgan, Station Manager  
P. Knapp, Health Physics (HP) Manager  
J. Reilly, Technical Manager  
B. Katz, Operations and Maintenance Support Manager  
A. Schramm, Unit 1 Superintendent  
D. Herbst, Site Quality Assurance (QA) Manager  
E. Medling, Corporate HP and Environmental Manager  
J. Shipwash, Compliance Supervisor  
R. Plappert, Compliance Supervisor  
J. Fee, Assistant HP Manager  
E. Goldin, Acting Assistant HP Manager

All the above noted individuals were present at the exit interview on March 23, 1989. In addition to the individuals identified, the inspector met and held discussions with other members of the licensee's staff.

### 2. Followup of Licensee Action on Unresolved and Open Items (92701)

Item 50-206/86-42-01 (Closed). This item involved the completion of action relative to IE Bulletin 78-08, Radiation Levels from Fuel Element Transfer Tubes, to conduct surveys of radiation levels at accessible distances along the Unit 1 fuel transfer tube during fuel transfer. The inspector reviewed surveys performed January 3 and 4, 1989, during fuel movement and noted a maximum contact dose rate of 100 mrem/h. General area dose rates in accessible areas during fuel movement were significantly lower. The inspector had no further questions in this matter.

Item 50-362/88-26-01 (Closed). This unresolved item involved problems, originally identified by the licensee's QA organization, with the control of radioactive material in that a number of contaminated items had been found outside the restricted area. Corrective Action Requests (CARs) S0-P-1171 and 1177 were issued by the QA organization to the HP organization to ameliorate the problem. The HP organization performed a root cause evaluation in accordance with HP procedure S0123-VII-1.6, Guidelines for Health Physics Critical Self-Appraisal Evaluation, and instituted corrective action. These included providing more restrictive release criteria; retraining personnel; installing commercially available, highly sensitive tool monitoring equipment; revising procedures to perform surveillances at both the restricted and protected area boundaries; performing routine surveys of non-radioactive material storage areas and requiring supervisory review for evaluation of the contamination status of materials. These actions were completed prior to the start of this inspection.

During the course of this inspection, the HP organization identified more than twenty other contaminated items during routine surveys, instituted as a result of the above noted events. These were all in storage in a refueling materials trailer which itself was in storage in an unrestricted area at the licensee's "Mesa" storage facility. The most highly contaminated of these had 4000 corrected counts-per-minute fixed on one item and 4000 disintegrations-per-minute removable on another.

The most highly contaminated item found during the entire period, a pressurizer relief valve which was the first item identified by QA, was determined by the licensee to contain 1.4 microcuries Mn-54 and 8.4 microcuries Co-60. The inspector determined that none of the items appeared to produce radiation levels in excess of the limits specified in 10 CFR 20.105 nor did any of the items appear to require the issuance of a written report in accordance with the requirements of 10 CFR 20.405 of 50.73. Indeed, many were contaminated to levels which would be difficult to detect in areas of elevated background count rates.

Unit 1 Technical Specification 6.8, Procedures and Programs, reads in part:

"Written procedures shall be established, implemented and maintained covering the activities referenced below:

"a. The applicable procedures recommended in Appendix 'A' of Regulatory Guide 1.33, Revision 2, February 1978."

Regulatory Guide (RG) 1.33, Appendix A, paragraph 7, Procedures for Control of Radioactivity, subparagraph e, Radiation Protection Procedures, reads in part:

"(4) Contamination Control"

HP procedure S0123-VII-7.3.2, Release of Potentially Contaminated Items from the Restricted Area, paragraph 6.4.3, reads in part:

"Individual items shall not be released from the Red Badge Zone/Restricted Area with any detectable licensed radioactive material above background."

The release of the above noted items with detectable levels of licensed radioactive material above background appears to be a violation TS 6.8. This was brought to licensee management attention during the course of the inspection and at the exit interview. Licensee representatives stated that they were intensifying efforts to control the potential for release of slightly contaminated items and were again reviewing their program to determine if further changes were required. It was noted that literally thousands of items are released from the restricted area each day and that assuring each of these items is not contaminated with radioactive material close to the level of the background is a monumental task.

Recognizing that these items were not removed from the licensee controlled area and that they were identified due to the diligence and

action was underway at the close of the inspection; the violation is not being cited because the criteria specified in Section V.G. of the Enforcement Policy were satisfied (NCV 50-362/89-08-01, Closed).

Item 50-206/12-12-88 (Closed). This item involves a situation at Unit 1 which occurred during mid-December involving attempts to backflush the letdown demineralizers to reduce the differential pressure (DP) across them. To this end, a jumper hose was connected from the demineralizers, across the backyard area, to the outlet of the Spent Resin Storage Tank. To accomplish the backflush, an Attachment 2, Abnormal Alignments and Evolutions, of Operations Division procedure S0123-0-23, Control of System Alignments, was initiated. The backflush of the North demineralizer was accomplished satisfactorily but a blockage developed during the backflush of the South demineralizer on December 12. By an as yet unknown mechanism, a significant quantity of resin and crud was trapped in the transfer line and produced a very high radiation area in the backyard area, up to 30 R/h on contact with the hose and 2 R/h at 3 feet. Efforts by Operations during the next two days to remove the blockage were unsuccessful and on December 14 the hose was disconnected and turned over to HP for disposition, thus removing the high radiation area from the backyard.

The high dose rates on the transfer hose were detected at 0510, December 12, and efforts to provide temporary shielding for the hose were completed at 0700. A survey of the unrestricted areas adjacent to Unit 1 was conducted at 0800, subsequent to shielding, and found a maximum of 0.04 mrem/h at the sea wall, 0.08 mrem/h on the beach and 0.5 mrem/h on the bluff overlooking the backyard.

The HP organization performed a root cause evaluation in accordance with S0123-VII-1.6 and the Operations division investigated the event in accordance with S0123-0-35, Operations Divisional Investigation Report. The HP evaluation identified that the dose rate on the bluff would be expected to be five to ten times the shielded level during the period prior to shielding, i.e. 2 to 4.5 mrem/h, and that this was in excess of the 10 CFR 20.105 level. Although a subsequent survey performed on the bluff at 2350, December 13, showed levels no greater than 0.5 mR/h when the transfer hose was alleged to be in an unshielded condition, it appears likely that the dose rate on the bluff during the initial hours of the event may have been in excess of 2 mrem/h for more than an hour.

10 CFR 20.105, Permissible levels of radiation in unrestricted areas, paragraph (b), reads in part:

"Except as authorized by the Commission pursuant to paragraph (a) of this section, no licensee shall possess, use or transfer licensed material in such a manner as to create in any unrestricted area from radioactive material and other sources of radiation in his possession:

of two millirems in any one hour..."

HP Procedure S0123-VII-7.4, Posting and Access Control, Attachment 1, reads in part:

"... A RESTRICTED AREA is any area where access is controlled for purposes of protection of individuals from exposure to radiation and radioactive materials. The physical boundaries of the normal Restricted Area at SONGS are defined by the Protected Area barriers as set forth in the SONGS Physical Security Plan. Additional Restricted Areas, such as the MPHf, may exist outside of the Protected Area boundary...."

The apparent existence of a dose rate in excess of 2 mrem/h for a period greater than one hour in the unrestricted area on the bluff overlooking the Unit 1 backyard between 0510 and 0700, December 12, appears to be a violation of the requirements of 10 CFR 20.105. However, as this might be considered of Severity Level IV, as it did not appear to be reportable, as the licensee took expeditious action to ameliorate both the radiation level on the bluff and the very high radiation area within the protected area, and as it was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation; the violation is not being cited because the criteria specified in Section V.G. of the Enforcement Policy were satisfied (NCV 50-206/89-08-01, Closed).

Further information regarding the attempted backflush of the letdown demineralizers was obtained from Operations representatives that stated the high DP across the letdown demineralizers was originally brought to their attention by a NRC inspector many years ago. They related a number of previous efforts to reduce the DP by backflush of the inlet and outlet screens, within the demineralizers, using installed piping but the inlet screen could only be backflushed through a 1" line whereas the outlet could be backflushed through a 3" line. Therefore, flow sufficient to clean the inlet screen could not be obtained. The Engineering department suggested that a 3" jumper hose be connected to the demineralizers, during the current outage while several inline valves were removed, and the demineralizer backflushed to the Spent Resin Storage Tank.

This suggestion was adopted and the action was instituted by Operations by way of the S0123-0-23 procedure. The inspector noted that use of the S0123-0-23 mechanism for attempted performance of the backflushes required concurrence only of Operations Division personnel. It was, however, clearly established during the course of the inspection that members of Engineering, Chemistry and HP participated informally in planning the evolution. It was not clear whether the substance of the operation itself would have been any different had other involved organizations been required to formally sign a specific, special procedure for the job.

6814 However, it was noted that Unit 1 had no mechanical reactor coolant filters ahead of the demineralizers and that any larger diameter debris



years and, also, that a 1½ reducer had inadvertently been left installed at the connection to the spent resin storage tank thus restricting the flow. It was also noted that the flushing medium was at a pressure in excess of the design rating of the jumper hose and fittings utilized. It was not clear whether the discovery and further consideration of these facts would have resulted had a special procedure been required for this job or whether they would have had any impact on the subsequent blockage of the transfer line, as the specific cause of the blockage was never determined. The blockage was determined to be somewhere in the Spent Resin Storage Tank outlet line, after the removal of the temporary jumper hose, and was not removed until the end of February by various system valvings and pressure applications.

S0123-0-23, Paragraph 1.0, Objectives, of reads:

- "1.1 To provide guidance for the control of system alignments during all plant modes.
- "1.2 To delineate the actions to be taken when a system is discovered misaligned.
- "1.3 To provide a method for altering system alignments when direction is not provided by any specific Operating Instruction."

Paragraph 6.7, Alignments and Evolutions Not Specified in Operating Instructions, reads in part:

"NOTE: During plant operation it may be necessary to change the alignment of system components to configurations not preplanned and specified by Operating Instructions. These alignments may be needed to facilitate maintenance, inspection, minor trouble-shooting, or modifications. This section provides a method for documenting and performing such changes. In addition, this section may be used to perform secondary plant in-service testing or hydrostatic testing after system maintenance.

"CAUTION Testing which could potentially involve an unreviewed safety question per 10 CFR 50.59 shall not be performed using this method. In such cases a special test procedure or other document will be developed, and submitted for proper technical and managerial review as required by Technical Specification 6.5.2.5."

Licensee management representatives noted that corrective action was being instituted as a result of the problems encounter during this operation, to consider changes to S0123-0-23 to require interdisciplinary review for evolutions that require the participation of other departments.

Further information is required to determine whether the use of S0123-0-23 for evolutions such as demineralizer backflushing is in

and administrative procedures and is acceptable or is a violation of deviation. This is considered an unresolved item (50-206/89-08-02, Open).

Item 50-206/12-21-88 (Closed). This item concerns an event at the Unit 1 Steam Generator (SG) "A" work platform which occurred on the night of December 21 and 22, 1988. A contract laborer, not subject to the overtime limitations of the TSs, that had entered containment at approximately 2200, December 21, and exited at approximately 0500, December 22, was found to have both the high and low range pocket ionization chambers (PICs), attached to the left elbow, off-scale upon exit from the controlled area. When the worker's thermoluminescent dosimeters (TLDs) were processed, the left elbow TLD indicated 1.600 rad and the chest provided the next highest whole body indication of 0.632 rad, the highest extremity ring was 1.160 rad.

The HP organization performed a root cause evaluation in accordance with S0123-VII-1.6. It was found that the worker had been assigned to assist in SG tube marking by adjusting the channelhead ventilation to keep the tubesheet dry, to resolve problems with the marking fixture and to shift the fixture between the manways. The worker had made several arm entries into the "A" SG during the course of the night with the right arm but spent the majority of time waiting in sitting and lying positions on the platform. The work was in a hot particle, Zone III, area and had continuous HP technician coverage. The worker wore full anti-contamination clothing with rain suit and air-supplied hood.

The worker entered the platform with technician 1, also dressed in Zone III protective clothing, and both remained there until 0030 when technician 1 left for dinner. Coverage was turned over to technician 2, who was in the Zone II area in full anti-contamination clothing only. At 0130, technician 3 relieved technician 2 in the Zone II area and technician 4 entered the Zone III to survey the platform after the fixture was moved to the coldleg. Technician 4 left when he was relieved by technician 1 at 0245.

After the worker's PICs were found to be off-scale, a detailed radiation level survey of the platform revealed a maximum dose rate greater than 5 rem/h, an Eberline RO-2 provided an off-scale reading, on contact with some lead blankets covering the SG diaphragms. A general area dose rate of 250 mrem/h was found between the shielded blankets and the open, hot leg manway. Also, general area dose rates on the opposite side of the platform were found to be 30-35 mrem/h. The diaphragms had been removed from the SG on or about December 7 and had been left on the platform with no additional posting provided. Statements by the involved individuals also indicated that the material condition of the platform was very poor in that a large quantity of various materials were cluttering the platform and some had completely obscured the shielded diaphragms. The involved worker's statement noted that the position that he occupied on the platform was the only clear area out of the shine from the open manways. This open area was directly adjacent to the diaphragms.

A tailboard had been held prior to the evenings work which had been attended by the involved technicians but not the involved worker. The tailboard dealt primarily with the required hot particle controls and the need to survey the worker every 15 minutes for particles. No surveys of the "A" SG platform were reviewed during or after the tailboard by the assigned technicians. All the involved technicians provided statements which documented that they were not aware of the high dose rate on the diaphragms prior to the exposure event. Of the survey documents of the "A" SG platform provided to the inspector by the HP organization which were performed between December 9 and 21, most dealt with hot particle surveys and dose rates from the SG manways, only two, dated December 19 and 21, identified a high dose rate, 2 R/h, on the lead blankets covering the diaphragms near the hotleg piping.

The HP root cause investigation identified several inadequacies which contributed to causing the event including: the storage of the diaphragms on the platform, the failure to post the diaphragms, the poor material condition of the platform, the inadequate tailboard, and the failure to shield and use a waiting area on the platform as intended by the ALARA Engineering group. The root cause investigation noted that the area was reposted, investigations initiated, and technician 1 elected to terminate employment rather than risk dismissal. The investigation also recommended that a multi-disciplinary group be formed to evaluate work on the SG platform, that efforts be increased to reduce the amount of non-essential time workers spend on the platforms, that the need for adequate tailboards be reemphasized, and that the need for first line supervisory presence on the job be reemphasized.

The QA organization also performed a surveillance, QASR SOS-012-89, subsequent to the event and identified a number of discrepancies in Corrective Action Request (CAR) SO-P-1192 and Problem Review Reports (PRRs) SO-004-89 and SO-005-89. These included: failure to post the diaphragms with a "Hot Spot" sticker as recommended by S0123-VII-7.4; identification that the involved worker had been on shift for 21 hours with the last 6 hours on the SG platform and may have been operating at reduced capacity; failure to perform an adequate pre-job tailboard in that the involved worker did not attend and hot spots and waiting areas were not discussed; and the appropriate procedure for temporary shielding installation, S0123-VII-3.2, had not been used when the diaphragms were initially shielded.

The inspector determined that the licensee had compiled an exposure history for the involved worker on a Form NRC-4 equivalent and that this had been signed by the worker on December 7, 1988. Licensee records indicated that the worker's dose was 1.683 rem for the fourth calendar quarter and 3776 mrem for the year immediately subsequent to this event, after his dosimetry had been processed. Therefore, no exposure in excess of 10 CFR 20.101 limits appears to have occurred.

However, it was clear from a review of the investigations, surveys, and statements of involved personnel and the presence of several technicians throughout the course of the event that the primary focus of the radiological controls was on the prevention of hot particle exposures to the extent that the high dose rates from the diaphragms were never

which indicate dose rates on the A-SG platform between December 9 and 21 even noted the shielded diaphragms.

It was noted that a similar exposure, in excess of a 10 CFR 20.101 limit, occurred during the third quarter of 1988 at Unit 1 and involved a worker, acting as a fire watch in containment, that sat near an obscured hot spot and was subjected to a non-uniform radiation field. (See Inspection Report Number 50-206/88-23.)

10 CFR 19.12, Instructions to workers, reads in part:

"All individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage, transfer, or use of radioactive materials or of radiation in such portions of the restricted area,..., in precautions or procedures to minimize exposure...The extent of these instructions shall be commensurate with potential radiological health protection problems in the restricted area."

Unit 1 Technical Specification 6.8, Procedures and Programs, reads in part:

"Written procedures shall be established, implemented and maintained covering the activities referenced below:

"a. The applicable procedures recommended in Appendix 'A' of Regulatory Guide 1.33, Revision 2, February 1978."

Regulatory Guide (RG) 1.33, Appendix A, paragraph 7, Procedures for Control of Radioactivity, subparagraph e, Radiation Protection Procedures, reads in part:

"(1) Access Control to Radiation Areas Including a Radiation Work Permit System

"(2) Radiation Surveys

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"(9) Implementation of ALARA Program"

HP procedure S0123-VII-4, Personnel Monitoring Program, paragraph 6.7, reads in part:

"... A Radiation Worker will be limited to 900 mrem whole body, 4.7 rem extremity and 3.75 rem skin exposure per calendar quarter or 2500 mrem whole body per calendar year...."

The failure to inform the involved worker of the radioactive diaphragms in storage on the SG platform and the high dose rate associated with them appears to be a violation of 10 CFR 19.12. (50-206/89-08-03, Open).

licensee's Practical Factors Training Facility, an unrestricted area, on February 23, 1989. The worker alarmed a personnel contamination monitoring booth, a PBM-200, the course instructor located two areas of contamination on the worker's clothing with a hand frisker and the instructor then called Operational HP for assistance. The HP organization performed a root cause evaluation in accordance with SO123-VII-1.6 and determined that the worker was probably contaminated the previous day, although the worker successfully passed through a PBM-200 prior to leaving the site.

The HP evaluation determined that the worker had purchased a sweatshirt at approximately 1200, February 22, during lunch and had worn it into the red badge zone that afternoon while working at the Unit 2/3 Hot Tool Crib. At approximately 1400, the worker attempted to exit the red badge zone and alarmed a PBM-200. The worker hand frisked and found no area of contamination. The worker assumed that the alarm was due to Noble gas activity, contacted a contract HP technician at the control point and the technician allowed the worker to complete an entry in the Noble Gas Log and leave the suspect sweatshirt in the personnel decon area until his return. The worker then cleared the PBM-200 and left the control point. The worker retrieved the sweatshirt at approximately 1415 and returned to work. The worker then left at the end of shift, at approximately 1515, wearing the sweatshirt and passing through a PBM-200 without an alarm, and drove home. The worker returned to work the next day and the particles were discovered during retraining.

The HP organization took control of the sweatshirt and recovered a  $9.3E-2$  microcurie particle from the inner right side of the sweatshirt above the waist and a  $1.8E-2$  microcurie particle from the inner left sleeve just above the cuff. Both particles were of mixed Co and Mn activation products. Surveys were made of all areas the worker and shirt had occupied since its purchase, including the workers home and car, and no further contamination or source of the particles was particularly identified, although many items with fixed contamination were found in the hot tool crib, none were identified with loose contamination. Time and motion studies were conducted and skin doses of 47 mrad and 28 mrad were assigned to the worker's whole body and extremity, respectively.

The root cause evaluation identified the primary failure as being that of the qualified technician for not personally performing a frisk of the individual, for allowing the worker to complete the entry in the Noble Gas Log and for not assuring that the worker cleared the PBM-200 with the sweatshirt on. Corrective actions proposed in the evaluation included disciplinary action against the technician, updating training, and the use of frisker monitoring personnel during non-outage periods. The site QA organization also performed a surveillance in regard to the event and issued a CAR, SO-P-1201, which identified the failure to comply with HP procedural requirements. The involved contract HP technician elected to terminate employment with SCE prior to disciplinary action being taken.

Unit 1 Technical Specification 6.8, Procedures and Programs, reads in part:

"a. The applicable procedures recommended in Appendix 'A' of Regulatory Guide 1.33, Revision 2, February 1978."

Regulatory Guide (RG) 1.33, Appendix A, paragraph 7, Procedures for Control of Radioactivity, subparagraph e, Radiation Protection Procedures, reads in part:

"(4) Contamination Control"

HP procedure SO-123-VII-7.7, Personnel Contamination Incidents and Decontamination Procedures, paragraph 6.1.1.2.3 reads in part:

"If after 6.1.1.2.1 and 6.1.1.2.2 above are performed and the contaminant cannot be located with the hand frisker a qualified Health Physics Technician shall perform a whole body frisk of the individual. For this purpose a qualified HPT is one who has been formally trained in Hot Particle Detection techniques.

"Following the whole body frisk by the HPT, if no contamination can be detected by the frisker, the individual shall be instructed to try the PBM-200 again."

The failure to complete the actions required by SO-VII-7.7 subsequent to the PBM-200 alarm appears to be a violation of TS 6.8. This was brought to licensee management attention during the course of the inspection and at the exit interview. However, as this situation was identified by the licensee, as it would appear to fit Severity Level IV, as it did not appear to be reportable, as it was corrected within a reasonable time with measures to prevent recurrence, and as it was not reasonably preventable in that the licensee has developed and implemented a comprehensive program for control and identification of hot particles; the violation is not being cited because the criteria specified in Section V.G. of the Enforcement Policy were satisfied (NCV 50-206/89-08-04, Closed).

Item 50-206/01-09-88 (Closed). This supervisor directed item involves the overflow of the Yard Drain System (YDS) and subsequent unplanned release of contaminated liquid on the night of January 5 and 6, 1989. On the evening of January 5, the Unit 1 yard sump pumps started on high level (the first pump starts at 8'7" and the second starts at 9'2") due to heavy rains; but the pumps were soon tripped by the sump radiation monitor, R-2101, at approximately 1845. A sample of the yard sump was taken shortly after the pumps were tripped and it indicated 4.3E-4 microcurie/cc.

The YDS and the sump were soon full and began to overflow through the grated manhole cover of catch basin #5, the system low point. The area between building A-40, the circulating water pit and the sea wall was soon flooded and overflowing into the spillway below the Sodium Hypochlorite Tank, which drains into the intake structure. The overflow

A ground water sample taken at 2155 in the flooded area indicated  $7.1\text{E-}5$  microcurie/cc and a water sample taken from the South circulating water pit, where a diver was working, at 0010 January 6, indicated  $6.6\text{E-}5$  microcurie/cc. During this time the sea water systems at Unit 1 had one salt water pump in operation which provided 3500 gpm flow.

At 0620, January 6, the submersible pump was re-aligned to the discharge side of the Oily Waste Separator which discharges directly to the outfall. Samples of the sump were taken at 0145 and 0905 and indicated  $2.0\text{E-}4$  and  $1.3\text{E-}4$  microcurie/cc, respectively. At 1025 the South circulating water pit was again sampled and indicated  $5.4\text{E-}5$  microcurie/cc. Unit 1 does not have the capacity to sample the outfall flow directly so no samples of the concentration of radionuclides in the actual effluent were possible.

Contamination in the YDS was also found to have produced elevated levels of contamination in the sewage treatment plant; a sample taken at 1020, January 6, indicated  $4\text{E-}6$  microcurie/cc and one at 0850, January 9, indicated  $3\text{E-}7$  microcurie/cc. It was subsequently determined that an 8" overflow line from the sewage treatment plant to the YDS was subject to reverse flow and leakage past an isolating flapper valve when the level in the YDS was greater than 9'. This event thus identified a source of contamination of the sewage treatment plant sludge.

After the water drained from the flooded area, surveys were performed which indicated a maximum of 120,000 dpm on a large area wipe and average contamination levels of 5-20,000 dpm. The contaminated area was controlled and was still being decontaminated at the conclusion of the on-site inspection.

Efforts to locate the source of the contamination eventually identified, by isotopic distribution, approximately 200 gallons of highly contaminated water,  $0.5$  microcurie/cc, which had been produced when the transfer hose noted in item 50-206/12-12-88, above, had been flushed to remove approximate 15 gallons of resin contained therein. This water was pumped into the New Resin Slurry Room (NRSR) floor drain at the direction of Operations, as this was thought to go to the Auxiliary Building Sump. The activity of the water was reduced during pumping by use of 5 micron sock filters on the transfer mechanism suction inlet but these soon clogged and were replaced by larger pore size, cotton glove liners. Later investigation revealed that the NRSR floor drain went to the yard sump. This pathway was identified on civil drawings which were not available to the Control Room Operators at the time of the event but which were discovered by the cognizant engineer afterward. Other drawings, which were available in the Control Room, identified other Auxiliary Building drains to the Auxiliary Building Sump but did not identify the NRSR floor drain, specifically.

A number of corrective actions were instituted and proposed, primarily by Operations and Engineering, after the event. These included: flushing the drainage path from the NRSR with approximately 100,000 gallons of

water to reduce activity levels, posting the NRSR floor drain to identify that it is not to be used for radioactive drains, updating the Control Room drawings, and procedure revisions. Longer term actions were also proposed to identify and label all floor drain pathways, provide an overflow line from the YDS to the intake structure to prevent flooding, change the level of the high level alarm, and raise the overflow invert at the sewage treatment plant.

The inspector reviewed the genesis of the YDS and its contaminated condition. The YDS sump was installed by Design Change (DC) 73-30 in 1975 in order to prevent flooding of the grounds during rainfall. Contamination was identified in the system in approximately 1981 and DC 82-03 installed a radiation monitoring system which would stop the discharge pumps on a high radiation alarm. The DC also identified that the change itself was being made as a result of the review required by IE Bulletin (IEB) 80-10 to identify non-radioactive systems that could become contaminated. The DC identified only the turbine cycle vents and drains as providing an unmonitored and uncontrolled path, should it become contaminated, which could provide contamination to the YDS. The DC assumed that the sump could later be decontaminated. A copy of the associated 10 CFR 50.59 safety evaluation for the installation of the monitor was reviewed and it found that the proposed change did not involve an unreviewed safety question and that it did not require a change to the TS but the specific answers to the questions dealt only with considerations regarding the monitor itself rather than the contaminated condition of the YDS. The Environmental Finding noted that the action would not result in a condition which significantly altered the impact of the station on the environment and that it did not involve a change to the Environmental TS.

Licensee responses to IEB 80-10, dated February 17 and March 31, 1981, identified the YDS as providing a potential release path to the environment from normally nonradioactive systems. They identified leakage and spillage from components in the controlled area which may overflow from the roof of the reactor auxiliary building or the refueling water storage tank and associated safety injection system lines and components as providing sources of contamination to the YDS. The letters also note that procedures were being revised to sample the system and a design change was being made to install a monitor. It was noted that the licensee's response to IEB 80-10, dated July 7, 1980, states that the identified non-radioactive systems, should they become contaminated, will have their operation restricted and a safety evaluation will be performed in accordance with the requirements of 10 CFR 50.59; but this letter did not identify the YDS as a potential subject. Subsequent events brought the potential for contamination of the YDS to the licensee's attention and this system was identified to the NRC in followup responses to IEB 80-10, dated February 17 and March 31, 1981; but no documented safety evaluation as committed in the letter of July 7, 1980, could be provided to the inspector.

The YDS has been known to be a contaminated system since 1981 and routine sampling commonly identifies contamination levels of E-6 to E-7 microcurie/cc, gamma, and E-5, tritium, with occasional spikes to higher values. Indeed, while reviewing the quantities and concentrations of



as a whole, it was noted that two weeks after the overflow and after the YDS had been flushed with over 100,000 gallons of water, the average concentration in the sump for the week of January 16 to 22 again spiked to the 1E-5 microcurie/cc, gamma, and 9E-4, tritium, level.

The USAR does not identify the YDS as being part of the Radwaste system or as being one of the Leakage Sources of paragraph 11.1.8 or one of the Sources Not Normally Part of the Radioactive Waste Systems of paragraph 11.1.9. Indeed, no mention of the YDS as a contaminated system could be found. No installed connection was identified between the YDS and the Radwaste system, the auxiliary building sump or the decontamination drain tank which could be used to transfer the radioactive liquid in the YDS to the Liquid Radwaste System for processing. Also, the YDS has no installed capability for processing.

Post-release calculations from the associated continuous and batch release permits of offsite doses, projected in accordance with the methodology of the Offsite Dose Calculation Manual (ODCM) for Unit 1, for the overflow period and January 1989 were reviewed and indicated the following:

<u>Period</u>	<u>Source</u>	<u>Dose in mrem</u>	<u>Target</u>
1-2 to 7	Normal YDS release	0.07	total body
		0.09	liver
1-5	Overflow of YDS	0.04	total body
		0.05	liver
1-6 to 9	Pumpdown of YDS to Oily Waste	0.07	total body
		0.09	liver

Recognizing that the YDS monitor is listed in the USAR, that this monitor is required by the TS, that the YDS effluent is sampled and analyzed and that resulting doses are calculated in accordance with the methodology of the ODCM and reported; the inspector had no further questions in this matter.

### 3. Semiannual Effluent Release Reports (90713)

The inspector performed an in-office review of the January-June 1988 Semiannual Effluent Release Report submitted in accordance with the requirements of Technical Specification (TS) 6.9.1.8. Radioactive releases and resulting doses for the period appeared to be below the TS limits of paragraphs 3.15, 3.16 and 3.17 for Unit 1 and 3/4.11 for Units 2/3 and in accordance with design predictions. Liquid particulate and radioiodine releases remained low. Quarterly summaries of hourly meteorological data, providing a listing of wind speed and wind direction by stability class, were supplied in the report. The assessment of doses to offsite members of the public appeared to be performed in accordance with the methodology specified in the ODCM. Changes to the Units 1 and 2/3 ODCM were documented and appeared appropriate. Three unplanned releases were also documented, one gaseous release from Unit 3 and two liquid releases one at Unit 2 and the other at Unit 3. All appeared minor in nature and corrective maintenance was specified to prevent

use of services for greater than thirty days, many due to design flaws. No events documented in the report would appear to be classifiable as abnormal occurrences.

The licensee seemed to be maintaining their previous level of performance in this area and their program appeared adequate to the accomplishment of its safety objectives. No violations or deviations were identified.

#### 4. Shipping and Transportation (83750)

Records of two radioactive waste shipments, II-R-88-07 and 8, which occurred in 1988 were reviewed. Radiation and contamination surveys; shipping papers; records of package marking and labeling; records of package loading, blocking and bracing; and records of vehicle placarding and driver instruction appeared complete and in compliance with the various NRC and DOT requirements as well as State and burial ground requirements. The implementation of the licensee's quality assurance program for the use of NRC-certified transport packages is discussed in paragraph 5, below.

Licensee management representatives stated that there had been no transportation incidents involving licensee shipments but that a letter indicating two violations had been issued to SCE by the State of Nevada regulatory authorities. The letter indicated that, on a shipment received at the Beatty facility on January 10, 1989, the clips which hold the placard on the front of the trailer had broken allowing the left side of the placard to swing about and that portions of the handwritten continuation pages of the manifest (carrier copy) were not legible. The inspector reviewed the event and the licensee's response and corrective action. The omission did not appear to represent a programmatic problem and the actions taken by the licensee appeared complete and appropriate to prevent recurrence. The event did not appear to be reportable. In view of the licensee's response to the State of Nevada's Notice of Violation, no further NRC action is proposed.

The quality control program requirements to ensure compliance with 10 CFR 61.55 and 56 requirements were specified in the following:

S0123-VII-8.1	Solid Radioactive Waste Sampling and Classification
S0123-VII-8.1.2	Solid Waste Curie Content Determinations
S0123-VII-8.1.4	Solid Radioactive Waste Packaging

These were reviewed and appeared to meet the requirements of 10 CFR 20.311. SCE Quality Assurance Audit Report SCES-016-88, which covered, among other areas, the licensee's program for waste classification and characterization, was reviewed. This audit identified minor program deficiencies in PRR S0-194-88. The corrective action for these were reviewed and appeared appropriate.

The licensee seemed to be maintaining their previous level of performance in this area and their program appeared fully adequate to the

accomplishment of its safety objectives. No violations or deviations were identified.

5. Radioactive Waste Management (84850)

The inspector reviewed Health Physics Procedures:

S0123-VII-8.0	Radioactive Material Control Program and Solid Waste Program Responsibilities
S0123-VII-8.1	Solid Radioactive Waste Sampling and Classification
S0123-VII-8.1.3	Handling and Storage of Radioactive Waste Packages
S0123-VII-8.1.4	Solid Radioactive Waste Packaging
S0123-VII-8.1.6	Radioactive Waste Package Accountability
S0123-VII-8.2	Shipment of Radioactive Material
S0123-VII-8.2.2	Shipment of Radioactive Waste for Land Disposal

These procedures appeared to adequately define and delineate individual and organizational responsibilities and appeared to have been appropriately reviewed and approved.

The licensee's QC program to assure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 61.56 was reviewed as described in paragraph 4, above.

More than twenty records of waste manifests and shipment labeling were reviewed for the period of January 1988 to date and appeared adequate to the requirements 10 CFR 20.311 (b), (c), and (d)(2).

Select records of waste classification and characterization were reviewed for the period of January 1988 to date and applicable quality control procedures were reviewed as noted in paragraph 4, above. The records identified approximately eleven waste streams and appeared to provide reasonable assurance of realistic representation. The requirements of 10 CFR 20.311 (d)(1) appeared to have been adequately addressed.

Select records of the forwarding of waste manifests and the verification of receipt of manifests were reviewed for the period January 1988 to date. Reviewed procedures expressed requirements to initiate investigations in any instance wherein acknowledgement of receipt of shipment has not been received within a specified period and to report such investigations. These appeared to adequately address the requirements of 10 CFR 20.311 (d), (e), (f) and (h).

The inspector determined that the licensee appeared to be adequately maintaining disposal site licenses and reviewed the States of Washington, Nevada and South Carolina licenses for their various low-level waste sites. Reviewed procedures seemed to adequately address adherence to disposal site criteria.

The licensee seemed to be maintaining their previous level of performance in this area and their program appeared fully adequate to the

accomplishment of its safety objectives. No violations or deviations were identified.

6. Transshipment of Spent Fuel from Unit 1 to Units 2/3 (86721)

The inspector reviewed Quality Assurance Surveillance Reports SOS-095-88, SOS-257-88, SOS-268-88, SOS-292-88, SOS-295-88, and SOS-070-89; performed relative to the fuel transshipment; and noted that only minor discrepancies which were corrected during the surveillance.

Unit 1 Provisional Operating License Amendment No. 116 and supporting documentation from SCE dated April 25, April 28, June 10, September 23, October 18, November 10 and December 1, 1988, were reviewed. Select completed copies of Special Nuclear Material Procedure S0123-X-9, Transshipment of Spent Fuel Using the IF-300 Cask, were also reviewed and appeared to comply with the requirements specified. The procedure appeared to have been adequately approved and maintained current.

The use of the IF-300 cask was reviewed and appeared to be in accord with its Certificate of Compliance. The request and approval to use the cask for transport of two bundles which exceeded 35,000 MWD/MTU was also reviewed and appeared satisfactory.

The transshipment was discussed with various participating personnel and no transportation incidents were identified. The transshipment appears to have been conducted in compliance with quality assurance program requirements and applicable NRC regulations.

The licensee appeared to have performed this operation in an exceptional manner and their program appeared to have evinced superior performance in the accomplishment of its safety objectives. No violations or deviations were identified.

7. Transportation Activities (86740)

The licensee's management control system was reviewed as noted in paragraph 5, above.

Training of personnel involved in transport activities was discussed with the cognizant radwaste supervisor and select technicians. All appeared knowledgeable regarding various transport requirements.

SCE Quality Assurance Audit Reports SCES-016-88, SCES-021-88 and NUPAC-1-88, which covered, among other areas, transportation activities; were reviewed. These identified discrepancies for which CARs were issued in the areas of spare parts procurement, training of vendor personnel, vendor inspector qualification and vendor auditor qualification.

Topical Quality Assurance Manual chapter 5-G, Packaging and Transport of Radioactive Material, delineates the QA program for transport of greater than type A quantities of radioactive material. Chapter 5-G appeared to adequately address the applicable criteria of 10 CFR 71 Subpart H as delineated in RG 7.10, Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material. Audit

SCES-016-88 appeared complete and timely and seemed to satisfactorily address the applicable Subpart H criteria. Audit NUPAC-1-88, dated August 30, 1988, was a vendor audit of Nuclear Packaging, Inc., which supplies safety-related items to SCE.

A licensee management representative stated that there have been several waste shipments of greater than type A quantities of radioactive material during the last year. These are shipped in NRC Certified casks, usually USA/9176/A and USA/9208/B. Current Certificates of Compliance for these packages were available and the inspector verified that SCE was a registered user. Routine maintenance on a certified package was in progress at the time of the inspection.

Applicable licensee procedures and over twenty select shipment records were reviewed for the period January 1988 to date. All records of package marking, labeling and radiation monitoring appeared appropriate. All determinations appeared complete and appropriate except for two shipments, II-S-88-25 and 29, which had been classified in accordance with S0123-VII-8.2 as Radioactive-LSA by the incorrect criteria. The specific activity criteria had been applied and Attachment 3 of the S0123-VII-8.2 had been incorrectly completed rather than the appropriate external contamination criteria being used. This was brought to the licensee's attention and an expeditious redetermination was made. This revealed that the materials would still be classifiable as Radioactive-LSA and, as such, no violation of DOT requirements appeared to have occurred. It was determined that the same individual had been responsible for performing the determination for both shipments.

Licensee procedures and shipment records were reviewed to determine the adequacy of shipping papers, loading and placarding and advance notifications. All appeared to comply with the applicable DOT and NRC requirements.

S0123-VII-8.2.10, Receipt of Radioactive Materials, was reviewed and over twenty select records of the receipt of radioactive material were reviewed. These appeared to comply with the requirements of 10 CFR 20.205.

The inspector determined through interviews, procedure reviews and document requests that the licensee had a system in place to maintain a record of each shipment of licensed material, quality assurance records documenting the adequacy of package components and records which document the activities affecting quality of transport packages. Additionally, the system also appeared to appropriately require the report of excessive levels of radiation or contamination, package defects or incidents. The licensee's system of records and reporting appeared to comply with the various applicable NRC and DOT requirements.

The licensee seemed to be maintaining their previous level of performance in this area and their program appeared fully adequate to the accomplishment of its safety objectives. No violations or deviations were identified.

8. Exit Interview (30703)

The inspector met with the licensee representatives, denoted in paragraph 1, at the conclusion of the on-site portion of the inspection on March 23, 1989. The scope and findings of the inspection were summarized. The inspector noted that, although the specific program areas examined appeared fully adequate, an unusual number of deficiencies were identified during the followup of open items. It did not appear clear that this number of items was an indication of a programmatic problem or breakdown but certainly expeditious action to address each of these was necessary. Licensee management acknowledged the findings and noted that corrective action had already been initiated for most of these.