



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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September 4, 2003

Mr. Harold B. Ray, Executive Vice President
Southern California Edison Co.
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, California 92674-0128

SUBJECT: NRC INSPECTION REPORT 050-00206/03-009

Dear Mr. Ray:

An NRC inspection was conducted on August 11-14, 2003, at your San Onofre Nuclear Generating Station, Unit 1 facility. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspection included an examination of selected procedures and representative records, observations of activities, and interviews with personnel. The enclosed report presents the results of that inspection. Overall, the inspection determined that you are conducting decommissioning activities in compliance with regulatory and license requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact the undersigned at (817) 860-8191 or Mr. Robert J. Evans, Senior Health Physicist, at (817) 860-8234.

Sincerely,

/RA Charles L. Cain for/

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle and Decommissioning Branch

Docket No.: 50-206
License No.: DPR-13

Enclosure:
NRC Inspection Report
050-00206/03-009

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No: 50-206

License No: DPR-13

Report No: 050-00206/03-009

Licensee: Southern California Edison Co.
P.O. Box 128
San Clemente, California 92674

Facility: San Onofre Nuclear Generating Station, Unit 1

Location: San Clemente, California

Dates: August 11-14, 2003

Inspector: Robert J. Evans, P.E., C.H.P., Senior Health Physicist
Fuel Cycle & Decommissioning Branch

Approved By: D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle & Decommissioning Branch

Attachment: Supplemental Inspection Information

ADAMS Entry: IR05000206-03-009 on 08/11/2003 - 08/14/2003; Southern
California Edison Co., San Onofre Nuclear Generating Station;
Unit 1. Decommissioning Report. No Violations.

EXECUTIVE SUMMARY

San Onofre Nuclear Generating Station, Unit 1 NRC Inspection Report 050-00206/03-009

This inspection was a routine, announced inspection of decommissioning activities being conducted at San Onofre Nuclear Generating Station, Unit 1. The inspection included a review of organization, management, and cost controls; self-assessment, auditing, and corrective action; decommissioning performance and status review; and radioactive waste treatment and effluent and environmental monitoring. Overall, the licensee was conducting decommissioning in accordance with regulatory and procedural requirements.

Organization, Management, and Cost Controls at Permanently Shutdown Reactors

- The licensee had implemented several self-check mechanisms for monitoring decommissioning work activities at Unit 1. Both the quarterly self-assessments and the routine leadership observations were useful management tools (Section 1.2).

Self-Assessment, Auditing, and Corrective Action at Permanently Shutdown Reactors

- The licensee's quality assurance program was in compliance with regulatory requirements. The licensee's quality assurance audit program was implemented as stipulated in the Quality Assurance Topical Report. Audits that were reviewed were thorough and were effective in identifying strengths and potential weaknesses (Section 2.2).

Decommissioning Performance and Status Review

- Radiation protection controls were in place to support decommissioning activities (Section 3.2.a).
- To control dismantlement of the sphere enclosure building wall, the licensee was taking appropriate safety precautions including use of extra rigging and controlling the heavy load path (Section 3.2.a).
- As Low As Reasonably Achievable (ALARA) principles had been incorporated into the cutting of the former reactor vessel mirror insulation inside of containment (Section 3.2.a).
- The licensee was maintaining the spent fuel pool within permanently defueled technical specifications and procedural requirements (Section 3.2.b).
- The licensee recently experienced a spill inside of containment when a hose connection in the primary makeup water system failed. The 700-gallon spill was contained, and the licensee subsequently repaired the hose connection (Section 3.2.c).

- The licensee recently implemented effective upgrades to improve the operability and reliability of the wide range gaseous effluent monitor (Section 3.2.d).

Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The licensee had established and implemented radioactive liquid and gaseous effluent release and radioactive environmental monitoring programs that were in compliance with license requirements. All required samples had been collected, no sample result exceeded any license or regulatory limit, and no adverse trends were identified (Section 4.2).

Followup

- The licensee reported apparent exceedances of the 20-day shipment time limit for low-level radioactive waste as required by 10 CFR Part 20, Appendix G. The licensee identified these apparent discrepancies during an internal audit. Corrective actions taken included revising three procedures (Section 5.1).

Report Details

Summary of Plant Status

San Onofre Nuclear Generating Station, Unit 1, was permanently shut down during November 1992 and was permanently defueled by March 1993. The unit remained in SAFSTOR until June 1999, when decommissioning was initiated. At the time of this inspection, the licensee was conducting decommissioning activities under the DECON option as stated in its Post Shutdown Decommissioning Activities Report dated December 15, 1998.

Work completed since the previous inspection included removal of the reactor coolant drain tank, reactor coolant pump lube oil collection tank, and pressurizer relief tank from inside of containment. Reactor coolant Pumps A and B had been removed and placed into shipping cradles. When the third reactor coolant pump is removed, all three pumps will be shipped to a commercial low-level waste disposal facility. Also, the main condenser tubes, main lube oil reservoir, and lube oil conditioner were removed from the turbine building.

The licensee began cutting the sphere enclosure building wall into blocks during July 2003. This work is expected to continue until January 2004. This work was tightly controlled by the licensee, in part, because of the safety hazards involved. The licensee also began cutting the reactor vessel mirror insulation inside of containment. This work has a significant radiological risk and was tightly controlled through the licensee's radiation protection program.

Work in progress during the inspection included upgrading the turbine building gantry crane to support future Unit 1 fuel movement activities, and construction of spent fuel canisters and storage modules. Pre-operational training for fuel movement was in progress using the Independent Spent Fuel Storage Installation (ISFSI) transfer cask, transfer trailer, and prime mover.

The reactor pressure vessel was still onsite. The vessel was being stored in its shipping container adjacent to the sphere enclosure building. The reactor pressure vessel shipping package was relocated to the north side of the sphere enclosure building during mid-May 2003 to allow for demolition of the western side of the sphere enclosure building wall. The reactor pressure vessel package is currently scheduled to be shipped to a disposal site in South Carolina beginning in late-October 2003.

1 Organization, Management, and Cost Controls (36801)

1.1 Inspection Scope

The inspector reviewed whether management systems contributed to public health and safety through the proper control, evaluation, and management of power reactor decommissioning activities.

1.2 Observations and Findings

Each organization involved in decommissioning was responsible for a self-assessment of its activities. The Unit 1 decommissioning self-assessments were being conducted quarterly. These self-assessments were noted to be an effective method of summarizing activities completed and for identifying any problems encountered during the implementation of these activities. The self-assessments effectively documented project accomplishments, successes, and challenges.

In addition, observations of Unit 1 decommissioning were being conducted and documented in leadership observation program reports. The work activities included work area inspections, housekeeping, tailboard meeting observations, and performance of decommissioning work. The licensee had conducted and documented an extensive number of these leadership observations.

1.3 Conclusions

The licensee had implemented several self-check mechanisms for monitoring decommissioning work activities at Unit 1. Both the quarterly self-assessments and the routine leadership observations were useful management tools.

2 Self-Assessment, Auditing, and Corrective Action (40801)

2.1 Inspection Scope

The objective of this portion of the inspection effort was to evaluate the effectiveness of licensee controls in identifying, resolving, and preventing issues that degrade safety or the quality of decommissioning. The inspector reviewed selected licensee controls, including self-assessments, audits, corrective actions, and root cause evaluations.

2.2 Observations and Findings

Appendix B to 10 CFR Part 50 states that the licensee shall be responsible for the establishment and execution of a quality assurance (QA) program. Further, this program shall be documented by written policies, procedures, or instructions and shall be carried out throughout plant life in accordance with those policies, procedures, or instructions. The licensee has a common QA program in place for all three units. The QA program consisted of audits, surveillances, observations, and inspections.

Audit requirements were specified in the licensee's QA Topical Report SCE-1-A dated July 2003. Section 17.2.18.2 of the report provided the routine audit requirements. The required audits included the license and regulatory compliance, quality assurance compliance, training and qualification, deficiency correction, and fire protection audits. Each audit is required to be conducted on a biennial basis. The inspector confirmed that the licensee had conducted or was conducting each audit within the 24-month time interval specified in the Topical Report.

Two audits were reviewed during the inspection, the routine fire protection program audit and the environmental - Offsite Dose Calculation Manual (ODCM) program audit. Fire Protection Program Audit SCES-004-03 was conducted during April-May 2003, while the Environmental - ODCM Audit SCES-007-02 was conducted during August-September 2002. Details of the Environmental - ODCM audit are provided in Section 4.2 of this inspection report.

The fire protection program audit determined that the program was implemented in a satisfactory manner. Two strengths were noted, but one continuing condition adverse to quality was identified. The auditors determined that corrective actions were ineffective for a previous root cause evaluation involving storage and control of combustible material, and additional corrective actions were initiated to provide resolution of the issue. The inspector concluded that the audit was a thorough review of the licensee's fire protection program.

2.3 Conclusions

The licensee's QA program was in compliance with regulatory requirements. The licensee's QA audit program was implemented as stipulated in the QA Topical Report. Audits that were reviewed were thorough and were effective in identifying strengths and potential weaknesses.

3 Decommissioning Performance and Status Review at Permanently Shutdown Reactors (71801)

3.1 Inspection Scope

The inspector evaluated whether the licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements.

3.2 Observations and Findings

a. Site Tours/Control of Radioactive Material

The inspector conducted tours of the Unit 1 facility to observe decommissioning work in progress. The inspector observed radiological area postings, boundaries, and housekeeping. Access to the restricted and contaminated areas was controlled by radiation caution signs, barricades, boundary lines, locked doors, and gates. Radiological boundaries were well defined and posted in all areas.

The inspector conducted radiological ambient gamma radiation surveys of the Unit 1 restricted areas using a Ludlum Model 2401-EC2 survey meter (NRC No. 016295G), in part, to confirm the accuracy of the restricted area postings. The radiation areas and high radiation areas were properly posted with warning signs and barriers as appropriate.

During site tours, the inspector observed the licensee cutting portions of the concrete sphere enclosure building wall. The licensee planned to cut the wall into 347 blocks. The maximum design weight of each block was 20,000 pounds. The first block was cut, lifted, and lowered to the ground on July 30, 2003. At the end of the onsite inspection, the licensee had cut eight top row blocks. The top row of blocks typically take longer to cut, in part, because these blocks contain extra metal previously used to support the roof structure. The licensee was using extra rigging to ensure that blocks would not fall during the cutting and lifting process.

The licensee suspended work below the concrete block lift, or temporarily suspended the lifts, depending on decommissioning or ISFSI activities in progress. The lift path was also controlled to prevent block movement over the fuel storage building. The concrete blocks were being transported to the "Mesa" area located east of Unit 1 for storage. The licensee planned to complete the cutting process during January 2004. The licensee also plans to begin crushing the blocks about April 2004. The licensee plans to release the crushed concrete for eventual use as road fill at a local military installation.

Also during site tours, the inspector observed the licensee cutting the former reactor vessel insulation inside of containment. The work was being conducted in accordance with Work Order 02020426001. Cutting of the insulation began on August 6, 2003. The licensee was segmenting the insulation using remote torch cutting techniques because the insulation was a significant radiological hazard. After being cut, the insulation was then folded using a mechanical folding apparatus. The folded insulation was then placed into high integrity shipping canisters. The licensee was noted to be using ALARA practices to minimize employee exposures. The ALARA practices included pre-job tailboard meetings, installation of lead shielding between the workers and the insulation, and establishment of low dose waiting areas. The licensee was proactive in its efforts to minimize occupational exposures.

b. Control of Spent Fuel Pool

The permanently defueled technical specifications (PDTs) provide the safety limits, limiting conditions of operation, and surveillance requirements for the spent fuel pool (SFP). Plant tours, record reviews, and interviews with plant operators were conducted to verify if the SFP was being maintained in accordance with PDTs and procedural requirements.

Safety Limit D2.1 specifies that the water level in the SFP shall be maintained above plant elevation 16 feet whenever fuel assemblies are stored in the SFP. Further, a water level limit of 40-foot, 3-inches was specified in plant procedures. The inspector observed the pool during the inspection and noted that the pool level was 40-foot, 7.5-inches.

Table D3.1.3-1 of PDTs requires that both chloride and fluoride be maintained less than or equal to 0.15 parts per million. The pool was sampled monthly by the licensee. The most recent sample results were reviewed. The sample results document that chloride and fluoride concentrations were less than 0.01 parts per million.

On July 19, 2003, the licensee secured the SFP cooling and cleanup system to allow for repair of the component cooling water heat exchangers. At the beginning of the heat exchanger work, the pool temperature was 76 degrees Fahrenheit. Pool temperature was 99 degrees when the heat exchangers were returned to service on August 14, 2003. The procedural limit for SFP temperature was 150 degrees with a high temperature alarm setpoint of 125 degrees. The pool temperature remained below the procedural limit during the time frame that both heat exchangers were out-of-service.

c. Primary Makeup Water Hose Failure Inside Containment

Primary makeup water is the only source of water that is provided inside of the Unit 1 containment. The water is used as flush water for the sump pump bearings. The water is also available for various other uses during decommissioning.

On May 23, 2003, the primary makeup water hose connection failed inside of containment, resulting in an uncontrolled release of clean water. When discovered, the licensee reported standing water on the floor of containment. The water supply valve was closed to terminate the leak. As expected, the eastern sphere sump pump started in automatic to lower the accumulated water level in the sump. The licensee estimated that about 700 gallons of primary makeup water was spilled inside of containment. The water was eventually pumped out of containment and into holdup tanks.

The licensee issued an action request to investigate the event. The cause of the event was attributed to a hose connection failure at the manifold inside of containment. The failure apparently occurred because the single-banded hose connection could not sustain the weight of the hose filled with water. The licensee subsequently reconnected the hose using a double-banded connection and retrained the hose in a manner that took the weight off the connection. Following repair, the primary makeup water hose was returned to service on May 30, 2003.

The inspector observed the primary makeup water connections in containment. A double-banded connection had been installed in accordance with the maintenance order instructions. The repairs were effective because the primary makeup water was in service with no leakage at the manifold connection point.

d. Operability of Radioactive Gaseous Effluent Monitoring Instrumentation

Wide range gas monitor R-1254 was used to monitor the plant ventilation stack for radioactive particulates, iodides, and noble gases. Operability of the monitor is required by PDTs which refers to the ODCM. When the monitor is out-of-service, contingency actions have to be taken to comply with ODCM requirements. Contingency actions include sample collection through alternate means.

As noted in previous inspection reports, monitor operability and reliability has been problematic for the licensee in the recent past. The licensee recently implemented a program to restore the monitor to a reliable condition. A work plan was developed to rework or replace rusted, corroded, worn, and failed components. The components replaced included valves, controls, connectors/adaptors, tubing, and wires. As noted in

NRC Inspection Report 50-206/2003-08, the inspector concluded that the licensee's decision to rebuild the monitor skid and to allocate a significant amount of staff time in an attempt to improve the reliability of the monitor was proactive on the part of site management.

During the current inspection, the inspector reviewed operability logs to ascertain whether previous maintenance activities were successful. The inspector noted that the monitor had remained in continuous service since May 16, 2003. This finding suggested that the licensee's efforts to restore the operability and reliability of radiation monitor RT-1254 were successful.

3.3 Conclusions

Radiation protection controls were in place to support decommissioning activities. To control dismantlement of the sphere enclosure building wall, the licensee was taking appropriate safety precautions including use of extra rigging and controlling the heavy load path. The ALARA principles had been incorporated into the cutting of the former reactor vessel mirror insulation inside of containment. The licensee was maintaining the spent fuel pool within permanently defueled technical specifications and procedural requirements. The licensee recently experienced a spill inside of containment when a hose connection in the primary makeup water system failed. The 700-gallon spill was contained, and the licensee subsequently repaired the hose connection. The licensee recently implemented effective upgrades to improve the operability and reliability of the wide range gaseous effluent monitor.

4 **Radioactive Waste Treatment, and Effluent and Environmental Monitoring (84750)**

4.1 Inspection Scope

The inspector reviewed the licensee's program to control, monitor, and quantify releases of radioactive materials to the environment in liquid, gaseous, and particulate forms.

4.2 Observations and Findings

Section D6.8.4.b of the PDTs states that a radiological environmental monitoring program shall be established, implemented, and maintained. Program requirements are contained in the ODCM. The inspector compared the ODCM requirements with the information provided in the licensee's 2002 radiological environmental operating report, submitted to the NRC by letter dated April 29, 2003. The inspector conducted a review of the documents and concluded that all required samples had been obtained, and no sample result exceeded the applicable regulatory limit.

According to the information provided in the 2002 annual report, measurable amounts of iodine-131 were identified in kelp samples and cesium-137 was identified in selected soil samples. These radioisotopes were found in both control samples unaffected by plant operations and indicator samples. The licensee previously concluded that the iodine-131 most likely originated from offsite medical facilities and the cesium-137 most

likely was originated from nuclear weapons test fallout. The licensee concluded that the site had a negligible radiological environmental impact during 2002. The inspector did not identify any sample result or other information that would refute this conclusion. Further, no adverse trends were identified.

During the review of the ODCM and 2002 annual report, the inspector noted several potential inconsistencies. For example, the licensee used an onsite sample station for public dose assessment but should have used an offsite, control location. The local crops section of the annual report did not discuss the results of sampling. In addition, several minor typographical errors were identified and reported to the licensee. The licensee stated that it would consider issuing a correction to the 2002 annual report as part of the 2003 report submittal.

The inspector also reviewed the licensee's most recent QA audit of the ODCM. Audit SCES-007-02 was conducted between August-September 2002. The audit covered the period of September 2000 through September 2002. The auditors did not identify any significant issues and concluded that the radiological environmental impact of plant operations was negligible. The inspector concluded that the audit was a thorough review of ODCM requirements.

4.3 Conclusions

The licensee had established and implemented radioactive liquid and gaseous effluent release and radioactive environmental monitoring programs that were in compliance with license requirements. All required samples had been collected, no sample result exceeded any license or regulatory limit, and no adverse trends were identified.

5 **Followup (92701)**

5.1 Notification of Shipment Discrepancies

On May 19, 2003, the licensee notified the NRC of apparent exceedances of the 20-day time period specified in 10 CFR Part 20, Appendix G, Subpart III(E)(1). This regulation states that any shipment or part of a shipment for which acknowledgment is not received within the times set forth in this section must: (1) be investigated by the shipper if the shipper has not received notification or receipt within 20 days after transfer; and (2) be traced and reported to the NRC.

The licensee recently initiated an internal audit of its low-level radioactive waste shipping practices. The audit identified that the licensee's shipping department was not date-stamping NRC Forms 540 when received from the disposal facility, and no additional record confirmed the date of Form 540 receipt. Since the receipt notifications were not time-stamped, the licensee did not clearly know how many of the notifications had been received within 20 days.

The licensee's review determined that 26 of 111 waste shipments for Unit 1 decommissioning activities may have taken over 20 days to arrive at the burial facility.

These shipments were made by rail. All shipments subsequently reached the burial facility; therefore, the NRC inspector concluded that the incident was not safety significant but was administrative in nature.

The licensee concluded that the apparent cause of the Unit 1 shipment discrepancies was a lack of clear procedural guidance. Three procedures were updated during May 2003. All three procedures now contain guidance to track the return of the NRC Forms 540. Should an NRC Form 540 not be received within 20 days, then an investigation will be initiated to trace the whereabouts of the shipment.

The licensee committed in its May 19, 2003, letter to submit a supplemental report to the NRC as necessary following the completion of its internal audit. The licensee anticipated that the audit will be completed during September 2003.

6 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the exit meeting on August 14, 2003. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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J. Fee, Manager, Maintenance
M. Kirby, Acting Unit 1 Operations Superintendent
J. Madigan, Manager, Health Physics
M. McBrearty, Engineer, Nuclear Regulatory Affairs
J. Reilly, Director, Unit 1 Decommissioning
A. Scherer, Manager, Nuclear Regulatory Affairs
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R. Waldo, Station Manager

INSPECTION PROCEDURES (IP) USED

IP 36801	Organization, Management, and Cost Controls at Permanently Shutdown Reactors
IP 40801	Self-Assessment, Auditing, and Corrective Action at Permanently Shutdown Reactors
IP 71801	Decommissioning Performance and Status Review at Permanently Shutdown Reactors
IP 84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 92701	Followup

ITEMS OPENED AND CLOSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IP	NRC Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
ODCM	Offsite Dose Calculation Manual
PDTS	Permanently Defueled Technical Specifications
QA	quality assurance
SFP	spent fuel pool