



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

August 11, 2005

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 050-00206/05-010

Dear Mr. Ray:

An NRC inspection was conducted on August 1-5, 2005, 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. The inspection determined that you were conducting decommissioning activities in compliance with regulatory and license requirements.

In accordance with 10 CFR 2.390 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/

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

Docket No.: 050-00206
License No.: DPR-13

Enclosure:
NRC Inspection Report
050-00206/05-010

Southern California Edison Co.

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cc w/enclosure:

Chairman, Board of Supervisors
County of San Diego
1600 Pacific Highway, Room 335
San Diego, CA 92101

Gary L. Nolff
Power Projects/Contracts Manager
Riverside Public Utilities
2911 Adams Street
Riverside, CA 92504

Eileen M. Teichert, Esq.
Supervising Deputy City Attorney
City of Riverside
3900 Main Street
Riverside, CA 92522

Raymond Waldo, Vice President,
Nuclear Generation
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

David Spath, Chief
Division of Drinking Water and
Environmental Management
California Department of Health Services
P.O. Box 942732
Sacramento, CA 94234-7320

Michael R. Olson
San Onofre Liaison
San Diego Gas & Electric Company
P.O. Box 1831
San Diego, CA 92112-4150

Ed Bailey, Chief
Radiologic Health Branch
State Department of Health Services
P.O. Box 997414 (MS 7610)
Sacramento, CA 95899-7414

Mayor
City of San Clemente
100 Avenida Presidio
San Clemente, CA 92672

James D. Boyd, Commissioner
California Energy Commission
1516 Ninth Street (MS 34)
Sacramento, CA 95814

Douglas K. Porter, Esq.
Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, CA 91770 James D. Boyd, Commissioner
California Energy Commission
1516 Ninth Street (MS 34)
Sacramento, CA 95814

J. T. Reilly, Director, Engineering
& Technical Services
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

Daniel P. Breig, Station Manager
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

A. Edward Scherer
Southern California Edison
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

Brian Katz, Vice President, Nuclear
Oversight and Regulatory Affairs
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92764-0128

bcc w/enclosure (via ADAMS e-mail distribution):

LDWert

DBSpitzberg

JCShepherd, NMSS/DWMEP/DD

CCOsterholtz, SRI

RJEvans

KEGardin

FCDB File

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RJEvans	DBSpitzberg	
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No: 050-00206

License No: DPR-13

Report No: 050-00206/05-010

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 1-5, 2005

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: IR05000206-05-010 on 08/01/2005 - 08/05/2005; Southern California Edison Co., San Onofre Nuclear Generating Station; Unit 1. Decommissioning Report. No VIOs.

EXECUTIVE SUMMARY

San Onofre Nuclear Generating Station, Unit 1 NRC Inspection Report 050-00206/05-010

This inspection was a routine, announced inspection of decommissioning activities being conducted at San Onofre Nuclear Generating Station, Unit 1 facility. Areas inspected included organization, management, and cost controls; decommissioning performance and status review; radioactive waste treatment and effluent and environmental monitoring; and followup of a previous licensee event notification. 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 an organization in place that was sufficient to conduct decommissioning activities (Section 1).

Decommissioning Performance and Status Review at Permanently Shutdown Reactors

- The radiologically restricted area was adequately controlled. Postings, signs, and boundaries were in compliance with regulatory requirements. Results of independent radiological surveys were consistent with posted radiation levels. Equipment required to be in service was found to be functional with setpoints consistent with license or procedural requirements (Section 2).
- The licensee was adequately controlling occupational safety during turbine building demolition activities. In addition, the waste debris was being radiologically surveyed prior to release from the Unit 1 industrial area in accordance with procedural requirements (Section 2).
- The licensee recently implemented an updated program for final status surveys and control of survey records. The implementation of the new program will help ensure that adequate documentation exists to support a decision to free-release existing components during a future phase of site decommissioning. The new program included proposed acceptance criteria, although NRC approval of the criteria will be necessary before the licensee can actually free-release a component using the new criteria (Section 2).
- The licensee was in the process of implementing a new water management plan that included re-routing of waste water from Unit 1 and construction of groundwater draw-down wells. The licensee began constructing these systems in accordance with guidance provided in engineering change packages and in accordance with commitments made in a license amendment request recently submitted to the NRC (Section 2).

Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The licensee had established and implemented programs for monitoring radioactive liquid and gaseous effluent releases as well as environmental monitoring. The programs were in compliance with license requirements. All required samples had been collected, no sample result exceeded the license and regulatory limits, and no adverse trends were identified (Section 3).

Followup

- During February 2005, the licensee reported a leaking plutonium-beryllium neutron source to the NRC. The status of the source was reviewed during this inspection. The licensee plans to ship the leaking source in a proper Department of Transportation specification package to the Department of Energy/Los Alamos National Laboratory for permanent disposal in the near future (Section 4).

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. DECON is defined as the immediate removal and disposal of all radioactivity in excess of levels which would permit the release of the facility for unrestricted use.

Work completed since the previous inspection included relocation of all remaining Unit 1 spent fuel from the Unit 2 spent fuel pool to the onsite Independent Spent Fuel Storage Installation (ISFSI). This activity was completed during June 2005. During May 2005, decommissioning of the containment sphere stopped when the primary work contractor suspended operations. At the time of this inspection, the licensee was contemplating its options for completing this project. Turbine building demolition commenced during mid-July 2005. The demolition of this structure was in progress during the inspection and was expected to continue for the next several weeks.

Equipment permanently removed from service since the last inspection included the liquid radwaste monitor R-1218, control room area radiation monitor R-1231, fuel handling building area radiation monitor R-1236, auxiliary building sump, east holdup tank, west holdup tank, decon drain tank, and primary makeup water tank. The radwaste system components were being physically removed from the radwaste building since the system was no longer required. The south salt water cooling pump was permanently removed from service since it was no longer required to provide radwaste discharge dilution flow. The licensee was preparing to decontaminate the liquid radwaste holdup tanks during the inspection.

The licensee recently submitted an amendment request to allow for discharge of waste water fluid from Unit 1 to the environment via the Units 2/3 outfalls. During the inspection, the licensee was in the process of constructing a new Unit 1 yard sump to replace the existing sump. Further, the licensee was installing discharge piping in the Units 2/3 yard for eventual connection to the Unit 1 yard sump. The licensee plans to place the new yard sump and flowpaths into service around December 2005, following NRC approval.

1 Organization, Management, and Cost Controls at Permanently Shutdown Reactors (36801)

1.1 Inspection Scope

The inspector reviewed the licensee's organizational structure to ascertain whether there was sufficient staff to support decommissioning activities.

1.2 Observations and Findings

The licensee's organizational structure is described in the defueled safety analysis report and the quality assurance program topical report. The organizational structure in place at the time of the inspection was compared to the required organizational structures. In summary, the actual organizational structure was in agreement with the required structures. Supervisory and managerial level positions continued to be filled with qualified individuals dedicated to the decommissioning of Unit 1. The positions of vice president-engineering & technical services and director-Unit 1 decommissioning were vacant but were being filled by qualified staff members on an interim basis. The inspector concluded that the licensee had sufficient staff for the work being conducted at Unit 1.

1.3 Conclusions

The licensee had an organization in place that was sufficient to conduct decommissioning activities.

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

2.1 Inspection Scope

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

2.2 Observations and Findings

a. Site Tours/Control of Decommissioning Activities

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

The inspector conducted independent radiological surveys using a Ludlum Model 2401-P survey meter (NRC No. 016296G, calibration due date 11/30/05). No abnormal radiological surveys were observed, and all ambient gamma exposure rate measurements were in agreement with posted radiation levels.

The inspector observed equipment in service to ensure that these components were being operated in accordance with the Offsite Dose Calculation Manual (ODCM) or plant procedures. Equipment required to be in service included the gaseous effluent monitor R-1254 and the yard sump radiation monitor R-2101. The inspector confirmed that each component was operating with trip setpoints that were in agreement with the licensee-approved "Radmonitor Setpoint Transmittal" document dated July 7, 2005. The inspector also confirmed that the monitor setpoints had been correctly calculated in accordance with the ODCM.

b. Demolition of Turbine Building Structure

During mid-July 2005, the licensee commenced with demolition of the former turbine building structure. The structure had been free-released by the licensee following extensive radiological surveying. The licensee was actively demolishing the structure during the inspection. The inspector observed the safety practices utilized by the licensee. Dust suppression methods included use of water sprayers. Boundaries and zones were clearly marked for hearing protection and for control of personnel access.

The licensee was transporting the debris offsite using commercial trailers. Site procedures stipulated that the waste debris be radiologically surveyed to ensure that the material was not contaminated with radioactive material. The inspector observed a licensee representative conducting these surveys using appropriate radiation detection equipment.

c. Final Status Survey Program Review

Prior to turbine building demolition, the licensee surveyed and grouted subsurface cavities, including a sump, pump wells, piping, and expansion joints. The inspector conducted a review of the final status survey controls. Since the previous inspection, the licensee established and implemented a new Unit 1 decommissioning procedure SO1-XXVIII-6.2.5, "Comprehensive Ground Record Program For SONGS 1 Decommissioning Project," Revision 0. This procedure provided controls for the generation, processing, storage, and retrieval of records documenting the radiological conditions of SONGS 1 to support future termination of the NRC license.

The inspector also reviewed the licensee's "Final Status Survey Plan for SONGS 1 Turbine Building Structures," a white paper dated May 31, 2005. This document was applicable for the subsurface structures that will be left in place during this phase of decommissioning. [The licensee elected to leave some substructures in place on an interim basis because of the physical difficulties that would be encountered if the licensee tried to remove these structures.] The final status survey plan included proposed derived concentration guideline levels. Although the licensee has developed a draft License Termination Plan for in-house use, the licensee is not expected to submit the document to the NRC in the near future for review and approval.

The licensee provided the inspector with a second white paper entitled, "Embedded Piping Survey Evaluation," dated August 1, 2005. This document provided an update of the actual radiological conditions identified in the field and the impact on the derived concentration guideline levels. Actual swipe sample results indicated that the contamination may be a mixture of cobalt-60 and cesium-137. The acceptance criteria provided in the original final status survey plan was based on the assumption that the contamination was predominately cesium-137. The inspector noted that the final status survey plan was out of date because of the new conclusions documented in the embedded piping survey evaluation report. During the inspection, the licensee issued an Action Request to ensure formal review and update, as necessary, of the guidance provided in the original final status survey plan. The NRC plans to conduct a detailed review of the implementation of the final status survey plan and comprehensive ground record program during future inspections.

d. Control of Water at Unit 1

By letter dated July 15, 2005, the licensee requested amendments to its Units 2/3 licenses to allow for the discharge of Unit 1 waste water through the Units 2/3 outfalls. The licensee plans to decommission the Unit 1 outfall in the near future. If approved by the NRC, rain water, groundwater, and other liquid effluents that are collected in the 11-acre Unit 1 area will be collected in a new sump and discharged to the ocean through the Units 2/3 outfalls.

The inspector reviewed the associated engineering change packages and observed the construction activities in progress. The construction of the new water collection and discharge system was described in three engineering change packages. Two of the packages were approved at the time of the inspection. These two packages provided the instructions for installation of new piping in Units 2/3 and the construction of the new sump. The third engineering change package was still being reviewed. This third package provided details about system controls, interlocks, and power supplies.

The inspector toured the Units 1, 2, and 3 yards to observe construction in progress. The base of the new 51,000-gallon sump had been fabricated, and the licensee was about to install the concrete walls. The current yard sump, with a 17,000-gallon capacity, was still in service. The discharge piping being installed in Units 2/3 consisted of 10-inch stainless steel piping. The piping had not been connected to the Units 2/3 outfalls. A licensee representative stated that the system will not be placed into service until NRC approves the license amendment request.

The licensee has elected to replace the existing yard sump with a new sump, in part, because of its plans to construct pump wells to draw down the local groundwater table to allow for decommissioning of subsurface components. The water table draw-down will provide "dry" conditions for excavation and backfill activities. Dewatering was expected to occur in seven phases to support various schedules of deep excavation into the groundwater table. The first phase was expected to commence during late-August 2005 and the last phase was expected to end about May 2007. Dewatering activities will support excavation of the turbine building south and north extension substructures, spent fuel and radwaste building substructures, existing yard drain sump piping, existing yard drains, and non-conforming backfill installed during the original construction of Unit 1.

The dewatering program will require the installation of about 29 wells at various times. The first phase will consist of the installation of 2-3 wells to support the excavation of non-conforming soil located on the western side of the former turbine building. The groundwater collected during this first phase will be routed to the existing yard drain sump for normal sampling and discharge via the Unit 1 outfall. During later phases of dewatering, the groundwater will be routed to the newly constructed Unit 1 yard sump and discharged via Units 2/3 outfalls, if approved by the NRC. Construction and operation of the dewatering wells will be reviewed by the NRC during future inspections.

2.3 Conclusions

The radiologically restricted area was adequately controlled. Postings, signs, and boundaries were in compliance with regulatory requirements. Results of independent radiological surveys were consistent with posted radiation levels. Equipment required to

be in service was found to be functional with setpoints consistent with license or procedural requirements.

The licensee was adequately controlling occupational safety during turbine building demolition activities. In addition, the waste debris was being radiologically surveyed prior to release from the Unit 1 industrial area in accordance with procedural requirements.

The licensee recently implemented an updated program for final status surveys and control of survey records. The implementation of the new program will help ensure that adequate documentation exists to support a decision to free-release existing components during a future phase of site decommissioning. The new program included proposed acceptance criteria, although NRC approval of the criteria will be necessary before the licensee can actually free-release a component using the new criteria.

The licensee was in the process of implementing a new water management plan that included re-routing of waste water from Unit 1 and construction of groundwater draw-down wells. The licensee began constructing these systems in accordance with guidance provided in engineering change packages and in accordance with commitments made in a license amendment request recently submitted to the NRC

3 Radioactive Waste Treatment, and Effluent and Environmental Monitoring (84750)

3.1 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.

3.2 Observations and Findings

a. Effluent Monitoring

Section D6.8.4.a of the Permanently Defueled Technical Specifications states that a radioactive effluent controls program shall be established, implemented, and maintained. The methodology used to monitor, sample, and analyze the liquid and gaseous effluents is provided in the Offsite Dose Calculation Manual (ODCM). The inspector compared the program requirements specified in the ODCM to the 2004 sample results as documented in the licensee's annual radioactive effluent release report dated April 27, 2005. The inspector also reviewed selected effluent release records for 2005. In summary, the licensee collected all samples required by the ODCM, and no sample result exceeded the applicable reporting level.

Gaseous effluents were monitored for fission and activation gases, iodides, particulates, and tritium. [During November 2004, the licensee discontinued sampling for noble gases and iodides when the Unit 1 fuel was permanently removed from the spent fuel pool and transferred to the onsite ISFSI.] The radionuclides detected in the gaseous effluent included hydrogen-3 (tritium), krypton-85, and small amounts of particulates. The sample results were less than 1-percent of the applicable effluent concentration limits.

The ODCM provides radiation dose limits for gaseous effluents. The quarterly dose limits are 5-10 millirads for noble gases and 7.5 millirems for tritium, iodine, and particulates. Actual radiation doses were well below the quarterly ODCM limits.

Liquid effluents were monitored for fission and activation products, tritium, dissolved and entrained gases, and gross alpha radioactivity. [The licensee discontinued sampling for dissolved and entrained gases during the fourth quarter of 2004 after the spent fuel had been transferred to the onsite ISFSI.] Measurable quantities of radioactivity were identified in liquid samples, but the quarterly results were below 1-percent of the ODCM limits.

The ODCM provides radiation dose limits for liquid effluents. The quarterly dose limits range from 1.5 - 5 millirems. Actual radiation doses at the site boundary were well below the quarterly ODCM limits for liquid releases.

The 2004 annual radioactive effluent release report also included solid waste shipment information. During 2004, the licensee shipped solid wastes to disposal sites in Utah and South Carolina. The licensee sent 42 shipments by rail and 19 shipments by truck. In addition, two shipments went to a volume reduction contractor. The contractor subsequently shipped the compacted wastes to the disposal site in Utah.

The inspector toured the Units 2/3 radiochemistry laboratory and interviewed a laboratory technician during the inspection. The radiochemistry laboratory was responsible for analyzing selected Unit 1 effluent samples. The laboratory was determined to be analyzing the samples within the time limit established in the ODCM. The inspector also reviewed records of recent sample results. The records indicated that the sample results were small fractions of the effluent concentration limits, and no upward trends were apparent. The inspector concluded that the radiochemistry laboratory was effectively and efficiently controlling and analyzing the Unit 1 samples.

b. Environmental Monitoring

Section D6.8.4.b of the Permanently Defueled Technical Specifications state 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 2004 radiological environmental operating report dated April 28, 2005. The inspector conducted a review of the ODCM requirements and annual results and concluded that all required samples had been obtained. No sample result exceeded the applicable regulatory limit.

Ambient radiation levels were measured at 49 locations with thermoluminescent dosimeters. The dosimeters were exchanged quarterly. During 2004, the average dosimeter control (background) measurement was 15.12 millirems per quarter, while the average indicator dosimeter measurement 16.10 millirems per quarter. The results suggest that plant operation had a negligible effect on the ambient dose rates.

The ODCM specifies that 30 dosimeters be installed approximately within the 0.4-5 mile range around the facility. Based on the control, indicator, and in-plant designations

documented in the 2004 annual report, the inspector noted that only 26 of the 49 dosimeters were located within this area. This issue was not safety significant because the licensee had an abundant number of dosimeters, but the licensee agreed to reconsider the dosimeter locations. The licensee issued an Action Request to track and document this review.

Airborne particulate and iodine-131 activities were measured at nine sample stations. The weekly particulate samples were analyzed for gross beta concentrations. No sample result exceeded the action level of 10 times the average control station value. Samples were composited quarterly and were analyzed for gamma-emitting radionuclides. Quarterly sampling identified only the naturally occurring radionuclide beryllium-7. No plant-derived radionuclide exceeded the lower limit of detection. In addition, iodine-131 activity was measured at each sample station using charcoal canisters. All iodine-131 sample results were below the lower limit of detection.

The inspector conducted a review of the operational history of the air sample stations. Based on the licensee's maintenance records, four of eleven air samplers were found to be either inoperable or out of tolerance six times during 2003-2004. The licensee was aware of the problem. One potential solution was to replace the air flow meters with a different type of meter. The licensee plans to replace selected meters in the near future and to monitor the operational history of these new meters for a period of time. If the new meters perform successfully, the licensee may elect to replace all of the meters. An Action Request had been issued to document and track the actions taken by the licensee.

Waterborne sampling included ocean sampling, drinking water sampling, shoreline sediment sampling, and ocean bottom sediment sampling. Naturally occurring potassium-40 and thorium-228 were identified in selected samples. No other radionuclide was identified in concentrations greater than the lower limit of detection.

Also collected were marine animals, local crops, soil and kelp samples. (Soil sampling and kelp sampling are not required by the ODCM.) According to the information provided in the 2004 annual report, measurable amounts of iodine-131 were identified in six kelp samples and measurable amounts of cesium-137 were identified in two 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 originated from nuclear weapons test fallout.

The licensee conducted an internal quality assurance audit of the ODCM program during August-September 2004. The audit consisted of both Unit 1 and Units 2/3 programs. The auditors concluded that both the effluent and environmental monitoring programs were managed effectively and were in accordance with ODCM requirements.

In summary, the licensee concluded that the site had a negligible radiological environmental impact during 2004. The inspector found that the sample results supported this conclusion. Further, no adverse trends were identified.

3.3 Conclusions

The licensee had established and implemented programs for monitoring radioactive liquid and gaseous effluent releases as well as environmental monitoring. The programs were in compliance with license requirements. All required samples had been collected, no sample result exceeded the license and regulatory limits, and no adverse trends were identified.

4 Followup (92701)

4.1 (Discussed) Licensee Event Report 050-00206/0509-02: Leaking Sealed Source

On February 23, 2005, the licensee informed the NRC that a 5-curie plutonium-beryllium sealed source was leaking. The leaking source was a 74-gram neutron source, MRC-N-SS-W-PuBe-463 (Monsanto Research Corporation, Neutron source, Stainless Steel container, Welded seal, Plutonium-239/Beryllium isotope, Serial Number 463). Sample results indicate that the amount of removable contamination was 1.35 microcuries with a reporting limit of 0.005 microcuries.

The plutonium-beryllium source was installed in Unit 1 about 1971 for use as a boron analyzer. During August 2004, the licensee attempted to remove the source as part of routine decommissioning, but during removal, the licensee recognized that the source container was cracked. Action Request 040800926 was issued to formulate corrective actions. One completed corrective action was to repackage the source into a new leak-tight aluminum overpack container.

At the end of the inspection period, the source remained in secured storage. The licensee plans to ship the source in a proper Department of Transportation specification package to the Department of Energy/Los Alamos National Laboratory for permanent disposal in the near future. Scheduling of the shipment was controlled by the Department of Energy. Following the transfer of the source, the licensee plans to report the material transfer to the NRC in accordance with 10 CFR 74.15 requirements.

5 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the exit meeting on August 5, 2005. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Corbett, Manager, Health Physics
J. Custer, Unit 1 Operations Superintendent
N. Hansen, REMP Specialist
B. Katz, Vice President, Nuclear Oversight & Regulatory Affairs
M. McBrearty, Engineer, Nuclear Regulatory Affairs
J. Morales, Manager, Decommissioning
A. Scherer, Manager, Nuclear Regulatory Affairs
J. Sills, Project Manager, Unit 1 Health Physics
C. Williams, Manager, Nuclear Regulatory Affairs

INSPECTION PROCEDURES USED

36801 Organization, Management, and Cost Controls at Permanently Shutdown Reactors
71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors
84750 Radioactive Waste Treatment, and Effluent and Environmental Monitoring
92701 Followup

ITEMS OPENED AND CLOSED

Opened

None

Closed

None

Discussed

050-00206/0509-02 LER Leaking Sealed Source

LIST OF ACRONYMS USED

ISFSI	Independent Spent Fuel Storage Installation
LER	Licensee Event Report
ODCM	Offsite Dose Calculation Manual