



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

July 10, 2015

Mr. Thomas J. Palmisano, Vice President
and Chief Nuclear Officer
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION – NRC INSPECTION
REPORT 050-00361/15-008; 050-00362/15-008

Dear Mr. Palmisano:

This refers to the inspection conducted from April 6-9, 2015, at your permanently shut down San Onofre Nuclear Generating Station facility, Units 2 and 3. Additionally, an in-office review of revisions made to the San Onofre Emergency Plan was conducted from January 16-April 9, 2015. The purpose of the inspection was to determine whether decommissioning activities were being conducted safely and in accordance with U.S. Nuclear Regulatory Commission (NRC) requirements. The preliminary inspection results were discussed with members of your staff at the conclusion of the onsite inspection. The inspection included a confirmatory radiological survey in which the NRC collected five split soil samples for independent analysis. The final inspection results were discussed with your staff by telephone on June 15, 2015, following receipt of the NRC's soil sample results.

During this inspection, NRC staff examined activities conducted under your license as they relate to public health and safety to confirm compliance with the Commission's rules and regulations, and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The enclosed report presents the results of this inspection. No violations were identified, and no response to this letter is required.

In accordance with 10 Code of Federal Regulations 2.390 (10CFR 2.390) of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

If you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234, or the undersigned at 817-200-1911.

Sincerely,

/RA/

Ray L. Kellar, P.E., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Docket No.: 50-361, 50-362
License No.: NPF-10, NPF-15

Enclosure:

NRC Inspection Report 050-00361/15-008; 050-00362/15-008

cc w/encl: Director, California Radiation
 Control Program
 R. Sholler, Southern California
 Edison Company
 W. Mathews III, Esquire, Southern
 California Edison Company
 J. Brabec, Southern California
 Edison Company
 E. Park, Esquire, Southern California
 Edison Company

If you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234, or the undersigned at 817-200-1911.

Sincerely,

/RA/

Ray L. Kellar, P.E., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Docket No.: 50-361, 50-362
License No.: NPF-10, NPF-15

Enclosure:
NRC Inspection Report 050-00361/15-008; 050-00362/15-008

cc w/encl: Director, California Radiation
Control Program
R. Sholler, Southern California
Edison Company
W. Mathews III, Esquire, Southern
California Edison Company
J. Brabec, Southern California
Edison Company
E. Park, Esquire, Southern California
Edison Company

DISTRIBUTION w/encl:

NRR Project Manager (Thomas.Wengert@nrc.gov)
NRR Licensing (Meena.Khanna@nrc.gov)
NMSS Project Manager (Marlayna.Vaaler@nrc.gov)
NMSS Licensing (Bruce.Watson@nrc.gov)
RSFS Branch Chief (Ray.Kellar@nrc.gov)
DNMS Director (Mark.Shaffer@nrc.gov)
DNMS Deputy Director (Linda.Howell@nrc.gov)
RIV Senior Health Physicist (Robert.Evans@nrc.gov)
RIV Senior Emergency Preparedness Inspector (Paul.Elkmann@nrc.gov)
Fee Coordinator (Marisa.Herrera@nrc.gov)
Congressional Affairs Officer (Jenny.Weil@nrc.gov)
RIV/ETA: OEDO (Michael.Waters@nrc.gov)

DOCUMENT NAME: S:\DNMS\RSFS\RJE\SONGS IR 15-008.docx

■ SUNSI Review By: RJE	ADAMS ■ Yes □ No	■ Publicly Available □ Non-Publicly Available		■ Non-Sensitive □ Sensitive	Keyword:
	OFFICE	DNMS:RSFS	DRS:PSB1	C:RSFS	
NAME	RJEvans	PJEIkman	RLKellar		
SIGNATURE	/RA/	/RA via email/	/RA/		
DATE	06/24/15	06/30/15	07/10/15		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 50-361, 50-362

License: NPF-10, NPF-15

Report: 050-00361/15-008; 050-00362/15-008

Licensee: Southern California Edison

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

Location: 5000 S. Pacific Coast Highway
San Clemente, California 92674

Dates: April 6-9, 2015

Inspector: Robert Evans, Ph.D., C.H.P., P.E., Senior Health Physicist
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Paul J. Elkmann, Senior Emergency Preparedness Inspector
Plant Support Branch 1
Division of Reactor Safety

Approved By: Ray L. Kellar, P. E., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

Southern California Edison
NRC Inspection Report 050-00361/15-008; 050-00362/15-008

This U.S. Nuclear Regulatory Commission (NRC) inspection was a routine, announced inspection of decommissioning activities being conducted at the San Onofre Nuclear Generating Station. In summary, the licensee was conducting site activities in accordance with procedures, license requirements, and regulations.

Spent Fuel Pool Safety

- The licensee continued to maintain the Unit 2 spent fuel pool and operate the spent fuel pool cooling equipment in accordance with technical specifications, licensee controlled specifications, and procedural requirements. (Section 1.2)

Decommissioning Performance and Status Review

- The licensee continued to prepare for future decommissioning activities, including cold and dark operations, in accordance with Post-Shutdown Decommissioning Activities Report requirements. (Section 2.2)
- The licensee continued to implement site characterization surveys, as discussed in the Post-Shutdown Decommissioning Activities Report, in accordance with the site characterization survey plan. (Section 2.2)
- The licensee conducted radiological release surveys within the main electrical switchyard using instructions provided in the site characterization survey program. The survey results indicate that the areas did not contain licensed material above the screening values or action levels. (Section 2.2)
- The NRC inspectors collected five split soil samples from the licensee. The sample results were less than the screening value limits, and the NRC's sample results were comparable to the licensee's sample results. (Section 2.2)
- The inspectors conducted site tours within the radiologically restricted areas and concluded that the licensee was maintaining the areas in accordance with radiation protection procedures and regulatory requirements. (Section 2.2)

Decommissioning Emergency Preparedness Program Evaluation

- The inspectors reviewed two revisions to the licensee's Emergency Plan and concluded that the changes did not reduce the effectiveness of the Plan. (Section 3.2)

Occupational Radiation Exposures

- During 2014, the licensee continued to monitor worker exposures to radioactive material. Individual occupational exposures were small fractions of the regulatory limits. The licensee continued to implement an As Low As Reasonably Achievable program, in part, to minimize worker doses. The licensee voluntarily monitored onsite ambient gamma radiation exposure

rates to ensure that no member of the public received a dose greater than the action level while onsite. The licensee's 2014 sample results indicate that no individual member of the public could have received a dose in excess of the action level while onsite. (Section 4.2)

Report Details

Site Status

The licensee elected to permanently shut down the SONGS facility in June 2013. At the time of the inspection, the licensee continued to prepare for site decommissioning. This work included preparation and construction of “cold & dark” modifications and implementation of spent fuel pool (SFP) islanding. The licensee continued to conduct site radiological and hazardous material characterization surveys in accordance with guidance provided in the Post-Shutdown Decommissioning Activities Report (PSDAR) dated September 23, 2014. The site characterization work was being conducted to prepare the site for future decommissioning and waste disposal activities. Finally, the licensee continued to conduct routine operations, maintenance and surveillance activities, effluent monitoring, and environmental monitoring as required by the two licenses.

1 Spent Fuel Pool Safety (60801)

1.1 Inspection Scope

The inspectors reviewed the licensee’s control and oversight of the Unit 2 SFP to ensure compliance with technical specifications and procedural requirements.

1.2 Observations and Findings

The inspectors conducted a review of the Unit 2 SFP and associated cooling system to ensure that the licensee was maintaining the pool in accordance with technical specifications, licensee controlled specifications (LCS), and procedural requirements.

Technical specifications provide the operability requirements for the two SFPs. These operability requirements include minimum water level and minimum boron concentration. The LCS specify that two SFP pumps and two SFP cooling heat exchangers shall be functional, one pump and heat exchanger shall be operating, and SFP water temperature should remain below 140-degrees Fahrenheit. Additional operational limitations and specifications are provided in Operating Instruction SO23-3-2.11, “Spent Fuel Pool Operations Limitations and Specifics.”

The inspectors conducted a walk down of the Unit 2 SFP to ensure compliance with technical specifications requirements. At the time of the inspection, the pool water level was 27-feet, 8-inches with a technical specification limit of 23-feet above the top of the fuel. The boron concentration was 2,822 parts per million with a technical specification lower limit of 2,000 parts per million. In summary, the Unit 2 SFP was being maintained in accordance with technical specifications requirements.

The inspectors also conducted a walk down of the Unit 2 SFP support equipment to ensure compliance with LCS and procedural requirements. At the time of the inspection, one SFP cooling pump and heat exchanger were in service, with the second pump and heat exchanger in standby. The system valves were aligned to support system operation. The inspectors also noted that the component cooling water and salt water systems were in service providing cooling water to the operating SFP heat exchanger. The Unit 2 SFP water temperature remained well below the 140-degree limit specified in LCS and site procedures.

1.3 Conclusions

The licensee continued to maintain the Unit 2 SFP and operate the SFP cooling equipment in accordance with technical specifications, LCS, and procedural requirements.

2 **Decommissioning Performance and Status Review (71801)**

2.1 Inspection Scope

The inspectors evaluated whether the licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements. In particular, the inspectors reviewed the licensee's progress towards implementing "cold & dark" modifications and site characterization surveys. In addition, the inspectors conducted site tours, in part, to observe the licensee's control of radioactivity and radiation areas within the radiologically restricted areas.

2.2 Observations and Findings

a. Review of Cold & Dark Modifications

Section II of the PSDAR provides an overview of the planned decommissioning activities. These activities include site modifications as necessary to support future decommissioning and decontamination efforts. One such modification specifically mentioned in Section II.A of the PSDAR is the planning, design, and implementation of cold & dark. The licensee plans to implement a series of cold & dark modifications to support future plant decommissioning work. These modifications include installation of temporary equipment to provide the electrical power, water, and ventilation needed to support decommissioning activities within the various plant structures. The inspectors reviewed the status of the licensee's efforts to implement the cold & dark modifications.

The licensee's cold & dark modifications consist primarily of two types of work, namely electrical and mechanical modifications. The electrical modifications include installation of a 12-kilovolt ring bus around the power block. From the ring bus, power will be distributed to all electrical loads needed to support decommissioning as well as temporary support equipment (ventilation, cooling). The electrical modifications will include installation of 480-volt load centers and motor control centers. Two backup diesel generators will be installed to provide power to essential loads during loss of offsite power events. One 1,500-kilowatt diesel generator will be used to support the SFP cooling systems and other essential loads. A 500-kilowatt diesel generator will provide power to telecommunications equipment.

With regards to mechanical modifications, the licensee planned to install fire detection equipment, in part, to meet the requirements of 10 CFR 50.48(f). These changes will include installation of new or repurposing of existing plant equipment such as fire alarm control units, fire detection monitors, and fire suppression equipment (water sources, pumps, and tanks as necessary). Power for the modified fire protection equipment will be provided by the ring bus. Other mechanical modifications include new and/or repurposed radioactive and non-radioactive water sumps, building ventilation, and salt water dilution pumps (for dilution of liquid releases to comply with license/Offsite Dose Calculation Manual requirements).

A command center will be constructed in the Units 2/3 control room to provide a centralized location for monitoring spent fuel cooling and other critical parameters necessary to support emergency preparedness activities. The command center will also include communication capabilities with offsite government agencies.

At the time of the onsite inspection, the licensee continued to conduct engineering analyses and some limited field work. The licensee had selected a contractor for implementing most of the work, and the contractor was in the process of mobilizing its staff. The licensee plans to retain control of operations and radiation protection, while the selected contractor will provide quality assurance, welding, rigging, work planning, and tools for the work to be accomplished. The licensee also plans to develop procedures and protocols for providing oversight of the contractor's work activities.

The licensee currently plans to implement cold & dark by early 2016. At that time, the licensee plans to retire all permanent plant equipment from service. The licensee plans to commence with building demolition in early 2017. In summary, the licensee continues to implement cold & dark modifications in accordance with PSDAR requirements. The inspectors will continue to review the licensee's implementation of cold & dark activities during future inspections.

b. Site Characterization Surveys

Section II.D.6 of the PSDAR provides the site characterization requirements. The inspectors reviewed the licensee's implementation of its site characterization program. During the inspection, the licensee continued to conduct site characterization surveys to help identify, categorize, and quantify the radiological, regulated, and hazardous wastes at the site. The results of the site characterization will be used, in part, to develop controls and procedures for removing and disposing of the radioactive and non-radioactive waste material from the plant.

The licensee's contractor developed a site characterization survey plan to control work activities related to characterization of the SONGS site. The inspectors concluded that the site characterization plan was sufficient for gathering information to assess and characterize the waste streams.

To conduct the site characterization, the site was divided into 15 survey areas. At the time of the inspection, the contractor was finalizing its characterization survey. After all data is collected, the contractor planned to compile the data, interpret the results, and conduct a quality control/quality assurance review of the data. When complete, the contractor will issue a draft survey report to the licensee for its review and comment.

During the inspection, the inspectors observed the licensee collecting a concrete core sample inside of the Unit 2 containment, at the 30-foot elevation near the elevator door. The licensee's contractor demonstrated good pre-planning, coordination, and health physics controls during the work activity. Radiation protection staff was present to ensure that the work was conducted safely with an emphasis on ALARA. The inspectors will review the contractor's historical site assessment and site characterization survey results at a later date, after the reports have been reviewed and approved by the licensee.

c. Radiological Surveys within Electrical Switchyard

The inspectors toured the main electrical switchyard and observed the licensee's efforts to prepare the area for cold & dark decommissioning operations. During the site inspection, the licensee was installing three small concrete pads in the switchyard. The pads will be used as foundations for electrical transformers and switchgear that will be installed in the near future. In addition to the three pads, the licensee recently constructed the Mechanical and Electrical Equipment Room (MEER) in the switchyard and was preparing for construction of a synchronous condenser.

The inspectors reviewed the licensee's radiological surveys within the switchyard. The licensee's contractor conducted a survey of the switchyard itself, as part of the site characterization program. In addition, the contractor conducted detailed surveys of the excavated areas where the four concrete slabs were constructed or being constructed for the electrical transformers, switchgear, and MEER structure.

As part of the site characterization program, the licensee's contractor measured ambient gamma radiation levels and collected soil and sediment samples from the switchyard. The contractor collected 20 systematic soil and 10 asphalt samples for analysis. The samples did not contain measurable quantities of licensed radioactive material. The contractor also collected 14 biased sediment samples from within or adjacent to the switchyard. The sampled locations included gutters, trenches, and catch basins. Ten of 14 samples contained measurable quantities of licensed material (cesium-137 and/or cobalt-60). The sample results were less than 10-percent of the NRC's screening values presented in Table B.2, Appendix B, "Screening Values," from NUREG-1757, Volume 1, Revision 2, Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensees. The source of the radioactivity was not clearly identified but could be attributed to either residual radioactivity from previous nuclear test fallout or wash-out from routine gaseous effluents over time.

In addition to soil sampling, the licensee conducted fixed point and scan surveys to measure ambient gamma radiation levels. One-minute static measurements were collected at 40 random locations. A walk-over gamma scan was conducted on approximately 10-percent of the estimated 30,000 square meter switchyard area. One elevated measurement was identified. The contractor concluded that the elevated measurement at this location was attributed to naturally occurring radioactive material.

The licensee's contractor also conducted radiological surveys of the areas where the four concrete pads (MEER structure and three transformer/switchgear pads) were located using the guidance provided in the site characterization survey program. The inspector reviewed the contractor's characterization survey plan, individual area survey plans, and background survey results. The inspectors noted that the proposed survey plans had several potential weaknesses that needed to be addressed by the licensee. For example, the site characterization survey plan did not appear to adequately address all of the guidance provided in NUREG-1575, Revision 1, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). In particular, the site characterization plan and individual survey plans did not provide clear instructions about background measurements and location of background areas, consistent with MARSSIM guidance. Further, the licensee's contractor was not clear about how it planned to release excess soil from the switchyard area, or other onsite areas, either by conducting surveys of the

soil in accordance with site procedures or by using the results of area surveys based on MARSSIM guidance.

In response, the licensee issued two corrective action reports (Notifications 203207251 and 203207430) to address the potential discrepancies between the characterization survey plan requirements and MARSSIM recommendations, prior to conducting the synchronous condenser area survey (discussed below) or release of the excess soil. The licensee updated the site characterization plan as recommended by the first Notification and analyzed the background requirements in the second Notification. The licensee agreed to clarify their procedure requirements for release of bulk material, such as soil or concrete, prior to actually releasing bulk material from the switchyard. The inspector concluded that these inspection findings were not safety significant because the licensee had not actually release the area or the soil at the time of the inspection.

The licensee's contractor measured the gamma radiation exposure rates at the new MEER and three transformer/switchgear pad excavations. The surveys included both fixed-point and scan surveys. The static and scan survey results were below the critical levels. The contractor also collected 23 surface and subsurface soil samples from the four areas. The licensee analyzed the samples for gamma-emitting radionuclides (including cesium-137 and cobalt-60), and no licensed-material was identified above the minimum detectable concentrations of the measuring equipment.

San Diego Gas & Electric plans to install a synchronous condenser in the southern portion of the main switchyard. The licensee notified the NRC by letter dated March 3, 2015 (ML15071A018) of its proposed plans to construct the synchronous condenser in the switchyard. The licensee submitted a proposed schedule as an attachment to the schedule, but the commencement of work depends on when the contract is issued. The NRC plans to conduct a confirmatory survey prior to construction of the concrete slab. The utility expects to have the synchronous condenser in service by July 2017.

To support this construction effort, the licensee's contractors developed a final status survey plan and cross-contamination prevention plan for the area where the synchronous condenser will be located. The proposed final status survey of the switchyard areas includes collection of surface and subsurface soil samples, walk-over scan surveys for gamma emitting radionuclides, and static measurements for gamma emitting radionuclides. The contractor commenced with soil sampling in the synchronous condenser area prior to the onsite inspection. The inspectors will review the final survey results for the synchronous condenser area concurrently with the performance of the confirmatory survey.

The NRC elected to collect confirmatory soil samples from the switchyard area. The NRC collected split soil samples from the licensee for comparison to the NRC's generic screening criteria provided in Appendix B to NUREG-1757. The inspectors collected five split samples from the licensee for independent analysis. The five samples included one composite sample from underneath the MEER structure, three composite samples from the three transformer/switchgear pads, and one composite of bore sampling in the area of the synchronous condenser. All samples were analyzed by the NRC's contractor, Oak Ridge Associated Universities, Oak Ridge, Tennessee. The samples were analyzed by gamma spectroscopy. The radionuclides of concern included cobalt-60 and cesium-137. The inspectors received the split sample results from Oak Ridge Associated Universities by letter dated May 19, 2015 (ML15155B529). All sample

results for cobalt-60 and cesium-137 were less than the minimum detectable concentration limit for the measuring equipment.

The inspectors reviewed the licensee's results for the five split samples. The licensee's samples were analyzed in April 2015. The samples were analyzed by gamma spectroscopy by an offsite laboratory. Similar to the NRC's sample results, the licensee's laboratory results indicated that the samples did not contain cobalt-60 or cesium-137 in concentrations that were above the minimum detectable activity of the measuring equipment. In summary, the two sets of split sample results were in agreement and none of the sample results exceeded the NRC's screening values.

d. Site Tours

During site tours within the radiologically restricted areas, the inspectors conducted independent gamma radiation measurements using a Ludlum Model 2401-EC2 survey meter (NRC No. 35484G, calibration due date of 03/13/16). The inspectors also observed the status of boundaries, postings, and labeling to ensure compliance with regulatory and procedural requirements. The inspectors' survey measurements were comparable to the survey results as presented on area maps created by the licensee's health physics staff. In the areas toured, the licensee had implemented radiation protection controls, including postings and labeling, that were in compliance with regulatory and procedure requirements.

e. Shipment of Radioactive Wastes (corrected totals)

The licensee notified the inspectors about a potential error in NRC Inspection Report 050-00361/15-007; 050-00362/15-007 dated February 11, 2015 (ML15042A331) regarding the number of shipments and quantity of wastes shipped from the site in 2014. Section 4.2 of the subject inspection report documents the shipment of "legacy" wastes from the site. Legacy wastes are wastes that had accumulated during plant operations and included resin-type material.

The original numbers, as documented in the previous inspection report, appear to have been estimates based on manifested volumes. During this inspection, the licensee provided the inspectors with updated information about the actual number of shipments and volume of wastes. For the period of January 1, 2014, through December 31, 2014, the licensee made 49 shipments containing approximately 52,760 cubic feet of material to the EnergySolutions facility in Clive, Utah. For the same time period, the licensee made seven shipments of waste containing approximately 2,817 cubic feet to the Waste Control Specialists facility in Andrews, Texas. Further, the licensee made 17 shipments of material to several sites in Tennessee and South Carolina for processing and eventual disposal. These 17 shipments contained approximately 13,100 cubic feet of waste material.

2.3 Conclusions

The licensee continued to prepare for future decommissioning activities, including cold and dark operations, in accordance with PSDAR requirements. The licensee continued to implement site characterization surveys, as discussed in the PSDAR, in accordance with the site characterization survey plan. The licensee conducted radiological release surveys within the main electrical switchyard using instructions provided in the site

characterization survey program. The survey results indicate that the areas did not contain licensed material above the screening values or action levels. The NRC inspectors collected five split soil samples from the licensee. The sample results were less than the screening value limits, and the NRC's sample results were comparable to the licensee's sample results. The inspectors conducted site tours within the radiologically restricted areas and concluded that the licensee was maintaining the areas in accordance with radiation protection procedures and regulatory requirements.

3 Decommissioning Emergency Preparedness Program Evaluation (82501)

3.1 Inspection Scope

The inspectors performed in-office reviews of the San Onofre Emergency Plan, Revisions 38 and 39. In these two revisions, the licensee: (1) converted licensed operators in the operations department to certified fuel handlers; (2) discontinued their structural fire brigade and implemented an incipient fire brigade that relies on Camp Pendleton Fire Department support; and (3) consolidated emergency response organization communicator responsibilities. The inspectors reviewed documents supporting these changes, including the Defueled On-Shift Staffing Analysis Report, the licensee's 10 CFR 50.58(f) analysis for implementing the incipient fire brigade, and the licensee's 10 CFR 50.54(q) analyses for Revisions 38 and 39.

3.2 Observations and Findings

The licensee submitted Revision 38 of the Emergency Plan to the NRC by letter dated November 24, 2014. The licensee concluded that the proposed changes to the Emergency Plan were primarily to align the Plan with the NRC-approved amendments to technical specifications. These amendments included changes reflecting the new staffing and training requirements for the operations staff.

The licensee submitted Revision 39 of the Emergency Plan to the NRC by letter dated December 18, 2014. In this revision, the changes were primarily to align the Emergency Plan with the current requirements of the Fire Protection Plan. The licensee concluded that the changes did not reduce the effectiveness of the Emergency Plan or related implementing procedures.

In summary, the inspectors concluded that the two revisions did not reduce the effectiveness of the licensee's Emergency Plan, and that the licensee continued to meet the requirement of 10 CFR 50.45(q)(2) to follow and maintain an emergency plan that met the requirements of 10 CFR 50 Appendix E and the planning standards provided in 10 CFR 50.47(b).

The inspectors noted that the licensee's analyses of the impact of changes to the Emergency Plan were not complete, stand-alone documents. The impact analyses depended on other documents, such as the licensee's 10 CFR 50.58(f) analysis that did not clearly identify the regulatory bases for the existing commitments, and did not provide rigorous justification for their conclusions that emergency preparedness capabilities were maintained. The inspectors also noted that the On-Shift Staffing Analysis Report may not have considered all necessary emergency response organization functions; for example, the need to maintain a continuous open line of communication with the NRC from the control room. In addition, there were confusing

terminology differences, such as the position titles used in the Emergency Plan and in the 10 CFR 50.54(q) analyses differing from titles used in the On-Shift Staffing Analysis Report. In response, the licensee reviewed some of these inspector findings and documented its review in Notification NN-203179829.

3.3 Conclusions

The inspectors reviewed two revisions to the licensee's Emergency Plan and concluded that the changes did not reduce the effectiveness of the Plan.

4 **Occupational Radiation Exposures (83750)**

4.1 Inspection Scope

The inspectors reviewed the licensee's occupational radiation exposure records for 2014 to ensure compliance with regulatory requirements. The inspectors also reviewed the status of the licensee's As Low As Reasonably Achievable (ALARA) program and the licensee's recent decision to revise the onsite monitoring program.

4.2 Observations and Findings

a. Review of Occupational Exposures

Regulation 10 CFR 20.1201 provides the occupational dose limits for adults. The inspectors reviewed the licensee's occupational exposure records for 2014 to ensure that no individual exceeded the regulatory limits. In summary, the licensee's records indicate that no individual exceeded any regulatory exposure limit.

The licensee's records indicate that approximately 750 workers were monitored in 2014, and the collective total effective dose equivalent was 1.369 rem. The total doses and number of workers monitored during 2014 were down from 2013 when approximately 2,000 workers were monitored and the collective total effective dose equivalent was 5.7 rem. The reduction in total doses coincides with the permanent shutdown of the plant in June 2013.

The highest individual dose for 2014, 0.218 rem, was assigned to a staff member who worked in the shipping department. This assigned dose was well below the regulatory limit of 5 rem.

Occupational exposures consist of internal and external doses. One individual was assigned an internal dose in 2014. This individual was conducting waste transfer activities in an area that was being monitored with a low volume general area air sampler. The individual was not wearing a respirator based on the work being conducted at that time. Respiratory protection was not required by procedure based on previous sample results in the area. The individual completed the work and exited the radiologically restricted area without setting off the alarm on the personnel contamination monitor, indicating that the individual was not externally contaminated. However, the air filter sample results indicated low levels of airborne contamination. The licensee conducted an internal review and elected to conservatively assign 0.039 rem of internal dose to the individual based on the air sample result. This assigned dose was well below the regulatory limit of 5 rem. In response to the incident, the licensee modified the

associated work procedure to require the use of lapel air samplers when work conditions are unknown. Lapel air samplers are expected to provide a more realistic assessment of actual breathing zone conditions versus general area air samplers.

Site workers in the radiologically restricted areas experienced four personnel contamination events in 2014-2015. In all four instances, individuals were found to have isolated contamination on their shoes when exiting the areas. The licensee concluded that the events were random and not representative of a pattern. No external or extremity doses were assigned to the workers based on the circumstances of each event.

During 2014, approximately 220 whole body counts were conducted to monitor for potential uptakes of radioactive material. All results were negative, and no internal doses were assigned to workers based on these sample results. In addition, no special bioassays were collected by the licensee during the year.

b. Review of ALARA Program

The inspectors reviewed the licensee's ALARA goals for calendar years 2014 and 2015. At the beginning of 2014, the licensee established an ALARA goal of 1.527 rem of collective dose, based on projected work activities. The actual collective dose for all workers was 1.369 rem. The department with the highest collective dose was the radiation protection department. These individuals provided routine support for site activities. The second highest collective dose was assigned to workers who conducted waste management and disposal work.

For 2015, the licensee established a site-wide ALARA goal of 0.547 rem. As of early April 2015, the collective dose was approximately 0.177 rem. The majority of the dose had been assigned to workers conducting the site characterization project. These workers were collecting radiation exposure measurements and surface contamination samples throughout the plant. In summary, the licensee continued to implement an ALARA program and continued to scrutinize worker doses on a routine frequency.

c. Review of Onsite Monitoring Program

The licensee voluntarily monitored the ambient gamma radiation exposure rates at various locations within the site boundary using thermoluminescent dosimeters. The licensee collected the data, in part, to ensure that sited visitors and members of the public did not receive a dose greater than the action level of 0.004 rem. (The regulatory limit for members of the public is 0.1 rem.)

The dosimeters were replaced and analyzed monthly. The inspectors reviewed the data results for 2014. The highest dose was measured in the north industrial area, the location where the onsite independent spent fuel storage installation was constructed and where radioactive wastes had been temporarily stored prior to shipment. The annual dose at this location, when corrected for background and occupancy factor, was 0.001547 rem, or about a third of the action level.

The licensee elected to reduce the number of onsite monitoring locations in September 2014. The licensee reduced the number of locations, in part, because the plant had

permanently shut down in 2013. The licensee concluded that the remaining dosimeters will provide adequate verification of public dose assessments.

In addition to monitoring various onsite areas with dosimeters, the licensee conducted routine monthly ambient gamma radiation surveys at the locations where the dosimeters were situated. The inspectors reviewed the most recent survey results. With a background of 7 micro-rem/hour, the survey results ranged from 4-10 micro-rem/hour. These survey results were comparable to the dosimeter sample results.

4.3 Conclusions

During 2014, the licensee continued to monitor worker exposures to radioactive material. Individual occupational exposures were small fractions of the regulatory limits. The licensee continued to implement an ALARA program, in part, to minimize worker doses. The licensee voluntarily monitored onsite ambient gamma radiation exposure rates to ensure that no member of the public received a dose greater than the action level while onsite. The licensee's 2014 sample results indicate that no individual member of the public could have received a dose in excess of the action level while onsite.

5 **Exit Meeting**

On April 9, 2015, the inspectors presented the preliminary inspection results to members of the licensee's staff. The inspectors presented the final inspection findings to the licensee's staff by telephone on June 15, 2015. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INSPECTION INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Adler, Principle Manager, Nuclear Engineering Programs
C. Ahola, Radiation Protection Manager
V. Barone, Design Engineer
L. Bosch, Manager, Oversight and Nuclear Safety Concerns
J. Brabec, Manager, Regulatory Affairs and Emergency Preparedness
J. Carey, Supervisor, Radiation Protection
D. Evans, Senior Nuclear Engineer, Regulatory Affairs & Emergency Preparedness
D. Faass, Regulatory Affairs Analyst, Regulatory Affairs & Emergency Preparedness
K. Gallion, Manager, Emergency Preparedness Planning
J. Janke, Manager, Radiological Control and Chemistry
J. McGehee, Manager, AREVA Site Characterization
M. Moran, Manager, Site Engineering
R. Pontes, Deputy Director, Decommissioning Projects
S. Vaughan, Radiological Control, Decommissioning

INSPECTION PROCEDURES USED

IP 60801	Spent Fuel Pool Safety at Permanently Shutdown Reactors
IP 71801	Decommissioning Performance and Status Review at Permanently Shutdown Reactors
IP 82501	Decommissioning Emergency Preparedness Program Evaluation
IP 83750	Occupational Radiation Exposures

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IP	Inspection Procedure
LCS	Licensee Controlled Specifications
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MEER	Mechanical and Electrical Equipment Room
NRC	U.S. Nuclear Regulatory Commission
PSDAR	Post-Shutdown Decommissioning Activities Report
SFP	spent fuel pool