UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

August 10, 2018

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 05000361/2018-002 AND 05000362/2018-002

Dear Mr. Palmisano:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on July 9-12, 2018, at the San Onofre Nuclear Generating Station (SONGS), Units 2 and 3. The NRC inspectors discussed the results of this inspection with you, and then with other members of your staff during a final onsite exit meeting conducted on July 12, 2018. A subsequent meeting was conducted telephonically on July 17, 2018, to inform members of your staff of the final significance of the violation identified during the inspection. The inspection results are documented in the enclosure to this letter.

This inspection examined activities conducted under your license as they relate to public health and safety, the common defense and security, and 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. Specifically, the inspectors reviewed the decommissioning planning activities for SONGS Units 2 and 3, controls for spent fuel safety, effectiveness of the personnel exposure monitoring and fire protection programs, and implementation of the effluent and environmental monitoring programs.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. The violation related to the licensee's failure to implement the Fire Protection Program as required by Technical Specifications 5.5.1.1.d, regarding combustible materials. Since the licensee placed the deficiency into its corrective action program, the safety significance of the issue was determined to be low, and because the violation was non-repetitive and not willful, then this violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2.a of the NRC Enforcement Policy. The current NRC Enforcement Policy is included on the NRC's Web site at (https://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html). This NCV is described in the subject inspection report.

You are not required to respond to this letter unless the description herein does not accurately reflect your corrective actions or your position. However, if you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to: (1) the Regional Administrator, Region IV, and (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.390 of the NRC's "Agency 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 Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC's Website 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 regarding this inspection report, please contact Rachel Browder at 817-200-1452, or the undersigned at 817-200-1151.

Sincerely,

/RA/

Janine F. Katanic, Ph.D., CHP, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Docket: 50-361; 50-362
License: NPF-10; NPF-15

Enclosure:
Inspection Report 05000361/2018-002;
05000362/2018-002
w/Attachment: Supplemental Information

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket Nos.	05000361; 05000362
License Nos.	NPF-10; NPF-15
Report Nos.	05000361/2018-002; 05000362/2018-002
Licensee:	Southern California Edison Company
Facility:	San Onofre Nuclear Generating Station, Units 2 and 3
Location:	5000 South Pacific Coast Highway, San Clemente, California
Dates:	July 9-12, 2018
Inspectors:	Rachel S. Browder, CHP, Senior Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
	Stephanie G. Anderson, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Accompanied By:	Bruce A. Watson, CHP, Chief Reactor Decommissioning Branch Office of Nuclear Materials Safety and Safeguards
	Marlayna G. Vaaler, Project Manager Reactor Decommissioning Branch Office of Nuclear Materials Safety and Safeguards
Approved By:	Janine F. Katanic, Ph.D., CHP, Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

San Onofre Nuclear Generating Station, Units 2 and 3
NRC Inspection Report 05000361/2018-002; 05000362/2018-002

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 (SONGS) Units 2 and 3. In summary, the licensee was conducting these activities in accordance with site procedures, license requirements, and applicable NRC regulations.

Decommissioning Performance and Status Review at Permanently Shutdown Reactors

- The licensee was implementing the decommissioning preparations and modifications as specified in the Post-Shutdown Decommissioning Activities Report. The plans developed reflected NRC guidance and satisfactorily met the regulatory requirements for decommissioning. (Section 1.2)

Spent Fuel Pool Safety at Permanently Shutdown Reactors

- The SONGS Units 2 and 3 spent fuel pools were being maintained in accordance with Technical Specifications and procedural requirements. The licensee was safely storing spent fuel in wet storage. (Section 2.2)

Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The licensee implemented and maintained the effluent monitoring and control systems for calendar year 2017 in accordance with the Offsite Dose Calculation Manual (ODCM). The licensee's program met the appropriate regulatory requirements set forth in the ODCM for sample collection methodology and locations, quality control and quality assurance of the program, and comparison of data results to pre-operational data results. (Section 3.2)

Occupational Radiation Exposure

- The licensee effectively implemented its "As Low As is Reasonably Achievable" ALARA program in accordance with procedures and regulatory requirements. The inspectors determined that the licensee continued to be effective in controlling radiation exposure of personnel. The licensee was adequately implementing its radiological survey program in accordance with Title 10 *Code of Federal Regulations* 20.1501, "Surveys and Monitoring". (Section 4.2)

Fire Protection Program

- The NRC determined that one Severity Level IV non-cited violation of Technical Specifications, Section 5.5.1.1.d, occurred based on the licensee's failure to maintain the Unit 3 Penetration Room free of combustible material and improperly storing combustible materials in inactive cable trays that were below active cable trays without the required10 feet vertical separation of combustible materials from cable trays. (Section 5.2)

Report Details

Summary of Plant Status

On June 12, 2013, Southern California Edison (SCE), the licensee, formally notified the NRC by letter that it had permanently ceased power operations at SONGS Units 2 and 3, effective June 7, 2013. The document is available in the Agencywide Documents Access and Management System (ADAMS) under (ADAMS Accession No. ML131640201). By letters dated June 28, 2013, (ADAMS Accession No. ML13183A391) and July 22, 2013, (ADAMS Accession No. ML13204A304) the licensee informed the NRC that the reactor fuel had been permanently removed from SONGS Units 3 and 2 reactor vessels as of October 5, 2012, and July 18, 2013, respectively. Upon docketing of these certifications, and pursuant to 10 CFR 50.82(a)(2), the SONGS, Units 2 and 3, facility operating licenses no longer authorized operation of the reactors or emplacement or retention of fuel into the reactor vessels. In response to the licensee's amendment request, the NRC issued the Permanently Defueled Technical Specifications on July 17, 2015, (ADAMS Accession No. ML15139A390) along with revised facility operating licenses to reflect the permanent cessation of operations at SONGS Units 2 and 3.

The licensee submitted its Post-Shutdown Decommissioning Activities Report (PSDAR) on September 23, 2014, (ADAMS Accession No. ML14269A033), which is required to be submitted within two-years following permanent cessation of operations under 10 CFR 50.82(a)(4). The PSDAR outlines the decommissioning activities for SONGS, Units 2 and 3; the PSDAR was reviewed by the NRC inspectors in a letter dated August 20, 2015 (ADAMS Accession No. ML15204A383). In the current plant configuration, the number of operable systems and credible accidents/transients is significantly less than for a plant authorized to operate the reactor or emplace or retain fuel in the reactor vessel.

On March 11, 2016, the NRC issued two revised facility operating licenses for SONGS Units 2 and 3 (ADAMS Accession No. ML16055A522), in response to the licensee's amendment request dated August 20, 2015, (ADAMS Accession No. ML15236A018). The license amendment allowed for the licensee to revise its Updated Final Safety Analysis Report (UFSAR) to reflect the significant reduction of decay heat loads in the SONGS Units 2 and 3 spent fuel pool (SFP) resulting from the elapsed time since the permanent shutdown of the units in 2012. The revisions support design basis changes made by the licensee associated with the implementation of "cold and dark" plant status as described in the PSDAR.

The NRC approved exemptions from certain emergency planning requirements in 10 CFR 50.47(b), 10 CFR 50.47(c)(2) and 10 CFR Part 50, Appendix E, Section IV, which became effective on June 5, 2015 (ADAMS Accession No. ML15105A349 and ML15126A461). These license amendments revised the SONGS emergency action level (EAL) scheme and emergency plan, respectively, to reflect the low likelihood of any credible accident at the plant in its permanently shut down and defueled condition that could result in radiological releases requiring offsite protective measures. The changes to the license were to provide conformance with the related exemptions granted to the licensee by NRC letter dated June 4, 2015 (ADAMS Accession No. ML15082A204). The changes were reviewed, and appropriate conforming changes were properly addressed in the applicable revision and section(s) of the SONGS UFSAR.

The licensee submitted a license amendment request dated December 15, 2016, (ADAMS Accession No. ML16355A015) to revise the Permanently Defueled Emergency Plan into an Independent Spent Fuel Storage Installation (ISFSI)-Only Emergency Plan (IOEP), and to revise the EAL scheme into an ISFSI-only EALs for SONGS Units 1, 2, and 3 ISFSI. The proposed changes would reflect the new status of the facility, as well as the reduced scope of potential radiological accidents, once all spent fuel has been moved to dry cask storage within the onsite ISFSI. This activity is currently scheduled for completion during 2019. The NRC issued amendments to the SONGS Operating Licenses to allow transition to an ISFSI-IOEP and EAL scheme on November 30, 2017 (ADAMS Accession No. ML17310B482). The NRC inspectors determined that the SONGS IOEP and associated EAL changes would provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the SONGS facility. The changes were reviewed, and appropriate conforming changes were properly addressed in the applicable revision and section(s) of the SONGS UFSAR.

License Amendment No. 169 (Unit 1), No. 237 (Unit 2), and No. 230 (Unit 3) were submitted on December 15, 2016 (ADAMS Accession No. ML16355A014), and approved by the NRC in a letter dated January 9, 2018 (ADAMS Accession No. ML17345A657). These license amendments changed the operating licenses and Technical Specifications (TS) to reflect the removal of all spent nuclear fuel from the SONGS, Units 2 and 3, spent fuel pools and its transfer to dry cask storage within an onsite ISFSI. The changes also made conforming revisions to the SONGS, Unit 1, TS and combined them with the SONGS, Units 2 and 3, TS. This license amendment will become effective as of the date the licensee submits a written notification to the NRC that all spent nuclear fuel assemblies have been transferred out of the SONGS spent fuel pools and placed in storage within the onsite ISFSI. In addition, the changes were reviewed, and appropriate conforming changes were properly addressed in the applicable revision and section(s) of the SONGS UFSAR.

On December 20, 2016, the licensee announced the selection of AECOM and Energy*Solutions* as the decommissioning general contractor for SONGS. The joint venture between the two companies will be known as SONGS Decommissioning Solutions (SDS). The SDS organization will manage the decommissioning activities as the decommissioning general contractor, which is described in the licensee's PSDAR.

The California Environmental Quality Act is the state equivalent of the federal National Environmental Policy Act. For SONGS, the California State Lands Commission (CSLC) will perform the California Environmental Quality Act review, which is triggered by the need to establish the final disposition for the offshore conduits that are under a CSLC lease. The Draft Environmental Impact Report was published for public comment on July 27, 2018, with two proposed hearing dates scheduled in August 2018.

Loading operations of the spent fuel into dry cask storage in the ISFSI was ongoing during this inspection period. The initial canister containing spent fuel was placed into the Holtec HI-STORM UMAX storage system on January 31, 2018. At the time of this inspection, the licensee was loading and transferring the 23rd canister onto the storage pad. The SDS organization had initiated planning for the site's decommissioning activities, which are scheduled to commence once the spent fuel has been moved to the new ISFSI expansion and the licensee has received the required permit from the CSLC.

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

1.1 Inspection Scope

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

1.2 Observations and Findings

The licensee submitted its PSDAR on September 23, 2014, as required under 10 CFR 50.82(a)(4). The PSDAR provides the general dates for each decommissioning phase implementation period and associated activities for that period. The licensee stated that the implementation of the activities described under each period may overlap and not necessarily be implemented consecutively. The majority of activities described under Period 1, "Transition to Decommissioning" and Period 2, "Decommissioning Planning and Site Modifications" have been implemented, as described in previous inspection reports. The licensee, under its decommissioning general contractor, SDS was planning and scheduling hazard mitigation activities in preparation for decommissioning, as described under Period 3, "Decommissioning Preparations and Reactor Internal Segmentation."

The inspectors reviewed the following SDS plans developed as Authorized Limited SAFSTOR Hazard Mitigating Activities, which were approved by SCE, the decommissioning agent.

- SDS-ENI-PLN-0001: *Containment Habitability*, Revision 0
- SDS-ENI-PLN-0002: *Reactor Vessel Internals Characterization Preparations*, Revision 0
- SDS-ENI-PLN-0003: *Building and Structures, Systems, and Components (SSC) Characterization*, Revision 0
- SDS-ENI-PLN-0004: *Shipment of Legacy Waste Material*, Revision 0

Based on a review of the activities developed under each plan and discussions with the SDS responsible individuals, the inspectors determined that the planned activities were developed in accordance with procedures and regulatory requirements. In addition, the planned activities did not constitute activities approved outside of the PSDAR. The inspectors observed that the SDS-ENI-PLN-0003 plan reflected the guidance provided in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Revision 1. This multi-agency document provides information on planning, conducting, evaluating, and documenting final status surveys for demonstrating compliance with dose or risk-based regulations. The licensee developed characterization survey plans based on several historical-site assessments. The inspectors discussed with SDS possible opportunities to obtain verbal historical assessments from current employees who have been at the facility for a long time.

The SDS-ENI-PLN-0004 plan described the transportation of legacy waste and referenced several NRC branch technical positions, which are acceptable methodologies for transportation. The SDS utilized the historical waste stream analyses for shipping some of the legacy waste; however, SDS explained to the inspectors they were analyzing new waste streams to reflect current activities at the site in order to support future transportation shipments. Currently, SDS was sorting and segregating waste in preparation for transportation activities this fall.

As part of the planning and characterization activities at the facility, SDS was performing evaluations for asbestos containing materials, in addition to the radiological characterization. The SDS representative explained that in the State of California, the Department of Toxic Substances Control classifies asbestos-containing material as hazardous waste if it is “friable” and contains one percent or more of asbestos. A friable waste is one that can be reduced to a powder or dust under hand pressure when dry. Whereas, under the U.S. Environmental Protection Agency, asbestos is not treated as hazardous waste under the Resource Conservation and Recovery Act. Therefore, if the material contains asbestos and radiological constituents, the licensee will package and transport the material as a mixed-waste shipment in the State of California; however, the material will only be treated as a radiological waste shipment at one of the licensed low-level waste disposal facilities in the United States.

The licensee was continuing to store liquids in tanks at the site as specified in the UFSAR, until SDS processes the water in accordance with regulatory requirements. The SCE Operations tracked the amount of liquids being held in the tanks and could move water to different storage tanks as needed. Following was the capacity of the tanks at the time of the inspection.

Component	Identifier	Capacity (gallons)	Percent Volume
Chemical Waste Tank	T-064	25,000	32
Radwaste Primary Tank	T-065	60,000	88
Radwaste Primary Tank	T-066	60,000	83
Radwaste Primary Tank	T-067	60,000	87
Radwaste Primary Tank	T-068	60,000	88
Miscellaneous Wastes Evaporator Monitor Tank	T-075	25,000	6
Miscellaneous Wastes Evaporator Monitor Tank	T-076	25,000	14
Radwaste Secondary Tank	T-057	120,000	28
Radwaste Secondary Tank	T-058	120,000	n/a

The inspectors walked down the new liquid rad-waste system flow-path and processing skid that was being installed at the facility. There was discussion between the inspectors and SDS regarding the liquid waste flow path and ensuring that pressurized hose(s) would not impact electrical equipment in the switchgear room. In addition, the inspectors and SDS reviewed other potential hazards from moving equipment, such as forklifts in the area. The inspectors reviewed some of the work packages, specifically SDS-1803-10014-8, for the installation of the new pressure vessels and routing new hoses from the skid system to the existing plant components. The inspectors determined that the work package referenced appropriate procedures and requirements to ensure sufficient controls were established for the evolution. In addition, the work

package contained appropriate safety and radiological controls. The associated radiation work permit (RWP) 18-0-605 generated for the work activity was reviewed and the inspectors determined that sufficient instructions and radiological controls were established in the RWP.

1.3 Conclusion

The licensee was implementing the decommissioning preparations and modifications as specified in the PSDAR. The plans developed reflected NRC guidance and satisfactorily met the regulatory requirements for decommissioning.

2 Spent Fuel Pool Safety at Permanently Shutdown Reactors (60801)

2.1 Inspection Scope

The inspectors conducted a review of the SONGS Units 2 and 3 SFP operations to ensure that the licensee was maintaining the pools in accordance with technical specifications and procedural requirements.

2.2 Observations and Findings

Technical Specifications 3.1.1 and 3.1.2 requires the SFP water level be maintained greater than or equal to 23 feet over the top of the irradiated fuel assemblies seated in storage racks, and the SFP boron concentration be maintained greater than or equal to 2,000 parts per million (ppm), respectively. In addition, SONGS UFSAR, Section 9.1.2.3, Safety Evaluation requires the SFP coolant temperature be maintained between 50°Fahrenheit (°F) and 160°F.

The SONGS Units 2 and 3 SFPs were being maintained above 27 feet from the top of the irradiated fuel assemblies, since the last inspection. The SFP cooling systems were holding temperatures steady at approximately 71°F - 75°F in each unit, which was within the (50°F – 160°F) range specified in the UFSAR.

The boron parameter was required to be analyzed weekly to verify the boron concentration in each SFP. The inspectors reviewed the data from each pool since February 2018, and determined that the boron concentrations were being analyzed as required and maintained at approximately 2,700 ppm. The inspectors determined that the licensee was adequately meeting the Technical Specification requirements for the Units 2 and 3 SFPs.

The licensee was monitoring the gamma activity in both spent fuel pools, along with other chemistry parameters, such as sulfates. The licensee's data indicated that the total gamma activity in each SFP ranged between 1.3E-04 to 3.7E-04 microcuries per milliliter (µCi/ml). The licensee continued to use a filtration system in each pool to minimize the radiation levels in the pool to support fuel movement and cask loading activities. The NRC inspectors performed a walk-down of the Unit 3 independent SFP system and the associated piping, pumps, and heat exchanger. In addition, the inspectors observed appropriate foreign material exclusion boundaries, radiological postings, and labeling to ensure compliance with regulatory and procedural requirements. The NRC inspectors

conducted independent gamma radiation measurements using a Ludlum Model 2401-S survey meter (NRC No. 079765, calibration due date of October 21, 2018). The results were consistent with the licensee's survey data for the Unit 3 spent fuel handling building.

Each of the two licenses has a condition that requires the licensee to develop and maintain strategies for addressing large fires and explosions. The strategies include the fire-fighting response strategy, operations to mitigate fuel damage, and actions to minimize the release of radioactive material. The licensee developed Procedure SO23-V-5.100, "SONGS Mitigation Strategies," Revision 21, to implement the license requirements. This procedure provided instructions and strategies in response to a large fire, explosion, or other events that resulted in extensive plant damage. Standard operating Guideline SOG-EO-0001, "Firewater to Plant Systems," Revision 16 also implemented guidance to the personnel assisting Operations during emergency events when alternate water and/or pumping sources are utilized. The inspectors conducted a review of the licensee's implementation of its mitigation strategies, in particular the licensee's implementation of its mitigation strategies to fill the spent fuel pool. The inspectors conducted a walk-down with an operator in which the strategy to fill the spent fuel pool was through the high flow makeup demineralized water supply in the case in which the fire suppression water system distribution piping became inoperable. The inspectors noted that the operator was knowledgeable in the equipment location, where to route the appropriate hose lines, and the use of the procedures.

2.3 Conclusion

The SONGS Units 2 and 3 SFPs were being maintained in accordance with the TS and procedural requirements. The licensee was safely storing spent fuel in wet storage.

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

3.1 Inspection Scope

The inspector reviewed the licensee's 2017 Annual Radioactive Effluent Release Report and the Annual Radiological Environmental Operating Report to verify that the program was implemented consistent with the licensee's technical specifications and Offsite Dose Calculation Manual (ODCM) requirements.

3.2 Observations and Findings

Technical Specifications Section 5.5.2 for the two licenses require the licensee to establish, implement, and maintain the ODCM. The ODCM provided detailed guidance for monitoring and controlling liquid and gaseous effluents, as well as calculating offsite doses. In addition, TS Section 5.7.1 requires the licensee to submit annual radiological environmental and radioactive effluent release reports to the NRC. The 2017 annual radioactive effluent release report was submitted on April 24, 2018, (ADAMS Accession No. ML18117A238). The 2017 annual radiological environmental operating report was submitted on April 30, 2018, (ADAMS Accession No. ML18134A043).

The annual radioactive effluent release report documented the gaseous and liquid effluents for 2017. The inspectors reviewed the annual report and compared the data and information provided against the requirements in the ODCM. The licensee

monitored releases of fission and activation products, tritium, dissolved and entrained gases, and gross alpha radioactivity in the liquid effluents. The licensee calculated the quarterly doses at the site boundary in accordance with the ODCM and the results were zero millirem (mrem) based on the liquid effluent releases. In addition, the licensee monitored gaseous effluents based on fission gases, iodines, particulates, and tritium. The resultant quarterly doses at the site boundary were calculated in accordance with the ODCM and were significantly less than 1 mrem.

The annual radioactive effluent release report also documented the shipments performed during calendar year 2017. The licensee made two shipments of solid waste to Energy*Solutions* LLC, Bear Creek facility in Tennessee, with ultimate disposal to Energy*Solutions*, Clive, Utah. The dry active waste consisted of approximately 8.5 cubic meters (m^3) containing approximately 2.6E-2 curies of activity. The inspectors confirmed there were no shipments of resins, filters, or irradiated components during calendar year 2017.

The inspectors conducted a walk-down with SDS personnel to observe the gaseous and liquid pathways at the facility. The inspectors reviewed the last administrative values for the radwaste liquid effluent, Unit 2 turbine plant sump, and north industrial yard drain sump and concluded that the unity rule was maintained as required by the ODCM. The licensee performed the annual land-use census as required by the ODCM and did not identify any changes in the sampling media or sample locations. The inspectors compared the results with the last annual land-use census and confirmed the licensee's assessment.

The NRC inspectors reviewed the annual radiological environmental operating report and concluded that the licensee had collected the required samples at the specified locations, and performed the analyses in accordance with the ODCM. The licensee monitored airborne, ocean water, drinking water, shoreline sediment, ocean bottom sediment, marine species, local crops, soil, and kelp in order to evaluate the effluent release program at the facility. Based on the air particulate and environmental sample results, there was no accumulation of radioactivity in the environment, as a result of licensed activities. The inspectors observed an offsite garden and operation of an air sampler at the same location. The inspectors reviewed the last calibration results for air sampler, Serial Number 27645, dated July 31, 2017, and determined the calibration was performed using a National Institute of Standards and Technology (NIST) traceable standard and in accordance with acceptable methodology.

The direct radiation measurements were conducted using calcium sulfate ($CaSO_4$) thermoluminescent dosimeters that were placed at 49 locations and analyzed quarterly in accordance with ANSI-N13.37, "Environmental Dosimetry – Criteria for System Design and Implementation" (2014) standard. The data results were indistinguishable from background radiation and therefore, the off-site dose calculation was non-detectable at those locations outside the exclusion area boundary.

The licensee documented and tracked each deviation from the ODCM as required by Section 5.0 of the ODCM. Deviations from the ODCM were associated with external factors not within the control of the licensee. The licensee stated that the 2017 deviations had no meaningful impact on the radiological environmental monitoring program and did not compromise the validity of the reported conclusions. The NRC

inspectors concluded that the deviations were within the criteria of the ODCM and did not impact the ODCM program.

3.3 Conclusions

The licensee implemented and maintained the effluent monitoring and control systems for calendar year 2017 in accordance with the ODCM. The licensee's program met the appropriate regulatory requirements set forth in the ODCM for sample collection methodology and locations, quality control and quality assurance of the program, and comparison of data results to pre-operational data results.

4 Occupational Radiation Exposure (83750)

4.1 Inspection Scope

The inspectors reviewed the occupational radiation safety program to verify the programmatic elements were being implemented as required by license condition and regulatory requirements.

4.2 Observations and Findings

The inspectors reviewed the implementation of the occupational radiation safety program by SDS decommissioning contractor. Specifically, the inspectors reviewed the following elements: (1) radiological work planning and controls program; (2) respiratory protection program; and (3) the exposure monitoring program.

The inspectors reviewed SDS Procedure SDS-RP2-PGM-2000, "Radiological Work Planning and Controls," Revision 3 and SDS-WC1-PCD-0001, "Work Management and D&D Planning," Revision 7. The inspectors determined that the procedures adequately addressed the implementation of radiological work planning and controls, in addition to providing a list of specific systems that required a radiological evaluation as part of the work planning process. The SDS Radiological Procedure SDS-RP2-PGM-2000 sufficiently captured the principals for ensuring As Low As is Reasonably Achievable (ALARA) work processes, performing an ALARA evaluation, as well as addressing engineering controls to reduce airborne contamination when practical to minimize the need for respiratory protection equipment. The inspectors reviewed a number of general and specific RWPs and concluded that the radiological control measures established in the permits were commensurate with the associated activities covered under the permit.

The inspectors reviewed SDS Procedure SDS-RP1-PGM-2000, "Respiratory Protection Program," Revision 1. The program procedures followed the guidance provided in *American National Standards Institute* ANSI Z88.2, "American National Standard for Respiratory Protection," and NUREG-0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials." As stated in the NRC Regulatory Guide 8.15, Revision 1, "Acceptable Programs for Respiratory Protection" the NRC determined that the recommendations in ANSI Z88.2-1992 may be used by licensees in establishing a respiratory protection program. The SDS planned to use the Draeger PANARAMA respirator type at the facility. The inspectors reviewed the SDS Procedure SDS-RP1-PCD-2003, "Respiratory Inventory, Control, Issue," Revision 1, and confirmed the inventory and control of the respirators located in the radiation protection control point. The SDS utilized a Portacount respirator fit test system, which is an acceptable

methodology to test the subject's respirator fit. The SDS stated that they may potentially use respirators the following week for radiological survey activities in the containment buildings. However, the SDS also stated its intention to utilize powered respiratory protection systems (PAPRs), which are self-contained units that blow air through a filter for breathing air, unlike a negative pressure respirator. The inspectors will continue to review the implementation of the respiratory protection program during future inspections.

The SDS utilized a *National Voluntary Laboratory Accreditation Program* supplier for its external exposure monitoring dosimeter, Mirion Technologies (GDS), Inc. (Lab Code: 100555-0). The SDS was monitoring the exposure dose goals and actual dose received during the calendar year. The dose budget was 2,036 mrem for calendar year 2018, and approximately 88 mrem had been used to support routine radiation protection activities and several job specific radiation work permits to support hazard mitigation. The remaining dose budget for the job specific radiation work permits was 1,788 mrem, which will primarily support work activities inside containment.

The inspectors reviewed SDS Procedure SDS-RP1-PCD-4001, "Radiation Protection Personnel Training Program Description," Revision 3 and determined that it reflected the requirements in TS, Section 5.3.1, that states in part, each member of the facility staff shall meet or exceed the minimum qualification of ANSI N18.1-1971 "Selection, Qualification, and Training of Personnel for Nuclear Power Plants" for comparable positions. The inspectors reviewed the radiation protection staff and selected a representative sample of employees and determined they were appropriately qualified and the documentation reflected the procedure requirements.

The inspectors assessed area radiological conditions in the facility including a representative sample of high-radiation areas. Based on the conditions and associated postings, the inspectors determined that the licensee was appropriately implementing the regulatory requirements under 10 CFR Part 20.

4.3 Conclusions

The licensee effectively implemented its "As Low As is Reasonably Achievable" ALARA program in accordance with procedures and regulatory requirements. The inspectors determined that the licensee continued to be effective in controlling radiation exposure of personnel. The licensee was adequately implementing its radiological survey program in accordance with 10 CFR 20.1501, "Surveys and Monitoring".

5 Fire Protection Program (64704)

5.1 Inspection Scope

The inspectors evaluated the overall adequacy and implementation of the licensee's fire protection program.

5.2 Observations and Findings

Title 10 CFR 50.48(f) states, in part, that the licensee shall maintain a fire protection program to address the potential for fires that could cause the release or spread of radioactive materials, or result in a radiological hazard. In addition, Section 5.5.1.1.d

of the TS, Appendix A to the two licenses, states that written procedures shall be established, implemented, and maintained for the fire protection program. The inspectors reviewed the licensee's fire protection program for compliance with regulatory and license requirements.

Regulatory Guide 1.191, "Fire Protection Program for Nuclear Power Plants During Decommissioning and Permanent Shutdown," describes the methods acceptable to the NRC for complying with the NRC's regulations for fire protection programs for licensees in decommissioning. This regulatory guide is referenced in the licensee's implementing procedures, and the inspectors compared the licensee's fire protection program to the guidance provided in the regulatory guide.

The licensee's fire protection program records included a fire hazards analysis. This document provided an analysis of the various plant areas and the fire protection requirements for those areas. The licensee also developed a detailed fire protection program document (Operations Fire Protection Program SO123-FP-1, Revision 30) that described staff responsibilities, program elements, and record requirements. In addition, procedures were developed to implement the various program attributes such as system operations, maintenance, design control, staffing, and training.

According to 10 CFR 50.48(f), the objectives of the fire protection program are to: (1) reasonably prevent fires that could result in a radiological hazard from occurring; (2) rapidly detect, control, and extinguish those fires that do occur; and (3) ensure that the risk of fire-induced radiological hazards to the public, environment and plant personnel is minimized. The inspectors compared the licensee's fire protection program against the objectives provided in the regulations.

To prevent fires from occurring, the licensee established and implemented administrative procedures for control of combustible material, transient fire loads, ignition sources, housekeeping, barriers, and impairments. The inspectors conducted site tours to confirm that the procedure controls were being implemented. In particular, the inspectors toured the fire areas in the Unit 3 Fuel Handling Building and Unit 3 Penetration Room where the licensee had the pre-fire plans. The inspectors concluded that the licensee was not effectively controlling combustible materials around ignition sources and impairments in these areas, in accordance with procedure requirements.

The NRC evaluated the licensee's implementation of procedures and determined that the licensee's failure to implement the inspection and control of combustible and transient fire loads procedure was a violation of Technical Specification, Section 5.5.1.1.d, which states in part, that written procedures shall be established, implemented, and maintained for the Fire Protection Program. The SDS procedure SDS-FP1-PCD-0005, Revision 3, Section 4.1.1.B requires, "Combustible materials, including but not limited to waste, debris, scrap, or packing materials, shall be removed from the laydown area following the completion of work or at the end of the shift, whichever comes first" and Section 4.1.1.D requires in part, "Combustible materials shall not be stored under cable trays, adjacent to vertical cable trays or placed next to energized plant equipment which could promote the spread of a fire involving these components".

Contrary to the above, on July 12, 2018, the licensee failed to maintain the Unit 3 Penetration Room free of combustible material, including but not limited to waste and

debris following the completion of the work and the licensee stored combustible materials in inactive cable trays that were below active cable trays without the required 10 feet vertical separation of combustible materials from cable trays. Specifically, the licensee had bags of waste throughout the Unit 3 Penetration Room and the licensee had a bag of waste and leftover distribution cables stored in an inactive cable tray that was located directly under an active cable tray that supported plant equipment.

This violation was evaluated to be a Severity Level IV violation using Section 6.3.d of the NRC Enforcement Policy, dated May 15, 2018, regarding the failure to implement procedures, which has a low safety significance.

Upon identification, the licensee entered the issue into its corrective action program as SDS Condition Report # SDS-00262. The licensee took the following immediate actions: (1) removed the identified bag of combustible materials from Unit 3 Penetration Room, completed July 12, 2018; (2) performed an extent of condition for all 10 CFR 50.48(f) fire areas, completed July 18, 2018; and (3) performed a stand-down with craft personnel to reinforce expectations on items pertaining to transient combustibles and housekeeping, completed July 16, 2018. The SDS informed the inspectors that additional actions under this condition report will focus on worker and supervisor behaviors to ensure appropriate safety culture attributes are instilled with consideration for additional actions pertaining to overall housekeeping.

Since the licensee placed the deficiency into its corrective action program, the safety significance of the issue was determined to be low, and because the violation was not willful or repetitive; therefore, this violation was treated as a non-cited violation (NCV), consistent with Section 2.3.2.a of the NRC Enforcement Policy (NCV 05000362/2018002-01, Failure to maintain Unit 3 Penetration Room free of combustible material).

The inspectors reviewed the licensee's ability to rapidly detect, control, and extinguish fires. The licensee installed and maintained equipment to detect fires including various types of smoke detectors and fire detection sensors. Fire suppression systems were in service including water storage tanks, pumps, valves, distribution piping, hose stations, sprinklers, and fire extinguishers throughout the plant. The inspectors also confirmed that the licensee implemented a surveillance and preventive maintenance program for the equipment in service.

The inspectors reviewed the licensee's staffing of the fire brigade. Section IV.D.2.b of the Fire Protection Program (SO123-FP-1, Revision 30) and Section 2.3 of the Updated Fire Hazards Analysis (Revision 30) provided the requirements for fire brigade staffing. The onsite fire brigade consisted of a minimum of two individuals, but the licensee routinely assigned at least three individuals per shift to the fire brigade. The fire brigade program procedure described the duties and responsibilities of the fire brigade during emergency situations. The inspectors confirmed that the licensee continued to assign staff to the fire brigade.

The onsite fire brigade could be supplemented by offsite emergency staff, based on the specifics of the emergency. The inspectors confirmed that the licensee had established a Memorandum of Agreement with the Camp Pendleton Fire Department for support

services during certain emergencies. Site security and radiation protection staff were available to support the fire brigade as needed. For example, site security could help expedite the onsite arrival of offsite support services.

The inspectors confirmed that the licensee had established a training program for fire brigade members, which included routine drills. The licensee maintained a list of qualified individuals who could be assigned to the fire brigade. The licensee also assigned a qualified individual to the position of fire marshal, separate from the fire brigade. The fire marshal was responsible for implementing portions of the fire protection program and to support the fire brigade as needed.

The inspectors reviewed and confirmed that the routine surveillances and preventive maintenance tasks were scheduled at the frequencies established in site procedures. The surveillances and preventive maintenance activities included pump tests, flow tests, and equipment operability checks. Also, the licensee established and implemented procedures for routine inspection of combustibles, transient fire loads, and fire doors.

Finally, the third regulatory objective for the fire protection program was to ensure that the risk of fire-induced radiological hazards to the public, environment, and plant personnel was minimized. The licensee utilized a “defense-in-depth” concept to minimize the consequences and probability of fire events resulting in radiological releases. The defense-in-depth concept included a combination of administrative controls, physical fire protection features, emergency response capabilities, and protection of critical systems and components such as the SFPs and support equipment. As noted above, the licensee implemented a fire brigade, emergency response instructions, and training program to help minimize the risks of radiological releases caused by fires. Critical equipment such as hoses and fire extinguishers were staged in various areas to support emergency response operations.

5.3 Conclusions

The NRC determined that one Severity Level IV NCV of Technical Specifications, Section 5.5.1.1.d, occurred based on the licensee’s failure to maintain the Unit 3 Penetration Room free of combustible material and improperly storing combustible materials in inactive cable trays that were below active cable trays without the required 10 feet vertical separation of combustible materials from cable trays.

6 Exit Meeting Summary

On July 12, 2018, the NRC inspectors presented the final inspection results to Mr. T. Palmisano, Vice President and Chief Nuclear Officer, and other members of the licensee’s staff. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified with the exception of all SDS procedures and documents reviewed during the inspection, which were marked as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
A.Bates, SCE, Regulatory Affairs and Oversight Manager
W.Richter, SDS, Fire Marshal
D.Arai, SDS, Fire Protection
S.Enright, SDS, Radiation Protection
D.Evans, SCE, Regulatory Affairs

INSPECTION PROCEDURES USED

IP 71801	Decommissioning Performance and Status Review at Permanently Shutdown Reactors
IP 60801	Spent Fuel Pool Safety at Permanently Shutdown Reactors
IP 84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 83750	Occupational Radiation Exposure
IP 64704	Fire Protection Program

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

05000362/2018002-01	NCV	Failure to maintain Unit 3 Penetration Room free of combustible material

Discussed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As is Reasonably Achievable
CFR	*Code of Federal Regulations*
CSLC	California State Lands Commission
EAL	Emergency Action Level
IOEP	ISFSI Only Emergency Plan
ISFSI	Independent Spent Fuel Storage Installation
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
NIST	National Institute of Standards and Technology
ODCM	Offsite Dose Calculation Manual
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PSDAR	Post-Shutdown Decommissioning Activities Report
RWP	Radiation Work Permit
SDS	SONGS Decommissioning Solutions
SCE	Southern California Edison
SFP	Spent Fuel Pool
SONGS	San Onofre Nuclear Generating Station
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report

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