



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
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October 14, 2016

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 05000361/2016-005 AND 05000362/2016-005**

Dear Mr. Palmisano:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on September 12-15, 2016, at the San Onofre Nuclear Generating Station, Units 2 and 3. The NRC inspectors discussed the results of this inspection with Mr. Lou Bosch, Plant Manager, and other members of your staff at the final exit meeting on September 15, 2016. The inspection results are documented in the enclosure to this inspection report.

The NRC inspection examined 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. 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 activities of Units 2 and 3 involving the transition to "cold and dark" plant status, synchronous condenser activities, spent fuel safety, fire protection program, and emergency preparedness program. No violations were identified and no response to this letter is required.

In accordance with 10 CFR 2.390, "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

T. Palmisano

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If you have any questions regarding this inspection report, please contact Rachel Browder at 817-200-1452, or the undersigned at 817-200-1197.

Sincerely,

/RA LEBrookhart Acting for/

Jack E. Whitten, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Docket Nos. 50-361; 50-362
License Nos. NPF-10; NPF-15

Enclosure:
Inspection Report 05000361/2016-005;
05000362/2016-005

w/Attachment: Supplemental Information

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket Nos. 05000361; 05000362

License Nos. NPF-10; NPF-15

Report Nos. 05000361/2016-005; 05000362/2016-005

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: September 12 - 15, 2016

Inspectors: Rachel S. Browder, C.H.P., Senior Health Physicist
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Robert J. Evans, Ph.D., C.H.P., Senior Health Physicist Fuel
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Approved By: Jack E. Whitten, Chief
Fuel Cycle and Decommissioning Branch Division
of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

NRC Inspection Report 05000361/2016-005; 05000362/2016-005 Southern California Edison

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

- The licensee had completed the cold and dark plant modifications in accordance with the Post-Shutdown Decommissioning Activities Report (PSDAR). 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. The licensee had installed the high flow makeup pump 2(3)MP-015 to support spent fuel pool makeup flow paths and support mitigating strategies for beyond design basis events involving a loss of spent fuel pool inventory. (Section 1.2)

Spent Fuel Pool Safety

- 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)

Fire Protection

- The inspectors reviewed the licensee's existing fire protection program including implementing procedures, equipment, staffing, training, and design control. The inspectors conducted walk-downs of plant equipment and observed control of combustible materials, housekeeping, and ignition sources. The inspectors concentrated on areas and equipment supporting the spent fuel pool (SFP) and SFP islanding equipment. In summary, the fire protection program was found to be in compliance with regulatory and license requirements. (Section 3.2)

Emergency Preparedness

- The inspectors concluded the licensee appropriately implemented the requirements of 10 CFR 50.54(q)(3) with respect to Permanently Defueled Emergency Plan, Revision 2, Permanently Defueled Emergency Action Levels, Revision 1, and associated procedures. The inspectors did not identify any reductions in the effectiveness of the Permanently Defueled Emergency Plan. The licensee was implementing its Permanently Defueled Emergency Plan as required and the capability to respond to an emergency was being maintained. (Section 4.2)

REPORT DETAILS

Site 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 Units 2 and 3, effective June 7, 2013, (ML131640201). By letters dated June 28, 2013, (ML13183A391) and July 22, 2013, (ML13204A304) the licensee informed the NRC that the reactor fuel had been permanently removed from Units 3 and 2, respectively. The licensee submitted its PSDAR on September 23, 2014, (ML14269A033). In response to the licensee's amendment request, the NRC issued the Permanently Defueled Technical Specifications on July 17, 2015, (ML15139A390) along with revised facility operating licenses to reflect the permanent cessation of operations at SONGS Units 2 and 3.

On March 11, 2016, (ML16055A522) the NRC issued two revised facility operating licenses for SONGS Units 2 and 3, in response to the licensee's amendment request dated August 20, 2015, (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 pools (SFPs) 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 implementing the "cold and dark" plant status 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 4, 2015. This action was in response to the licensee's application for exemptions dated March 31, 2014, as supplemented by letters dated September 9, October 2, October 6, October 7, October 27, November 3, and December 15, 2014. The NRC's authorized exemptions and safety evaluation are available as enclosures to NRC letter dated June 4, 2015, (ML15082A204). The licensee issued its Permanently Defueled Emergency Plan (PDEP) on July 8, 2015, which implements the emergency preparedness program as authorized by the NRC. The licensee issued Revision 1 to its PDEP on July 8, 2015, and Revision 2 was issued on August 1, 2016. Both revisions were issued under the licensee's 10 CFR 50.54(q) process. The NRC inspectors had reviewed these revisions and concluded the changes did not reduce the effectiveness of the plan.

The licensee has completed the installation of the 12-kilovolt, non-safety and seismic Category III, electrical ring bus and associated equipment that will facilitate decommissioning of various plant systems. The spent fuel was being safely stored in the two spent fuel pools. The fire protection and emergency preparedness programs were being implemented in accordance with license conditions. The licensee was moving forward with the construction activities in the Unit 1 north industrial area in support of the expansion of the independent spent fuel storage installation.

1 Decommissioning Performance (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

Several tours of the facility were performed during the inspection that included the radiologically controlled area, fuel storage building, turbine building, and the auxiliary building. Housekeeping and facility conditions were observed to be effectively controlled and continued to be satisfactory during the decommissioning activities reviewed as part of the inspection. The licensee had completed the installation of the 12-kilovolt, non-safety and seismic Category III, electrical ring bus and associated equipment that will facilitate decommissioning of various plant systems. The installation of the ring bus required approximately four miles of 14-kilovolt cable to support the outer ring bus and approximately 18 miles of distribution cable throughout the plant site. There were 243 work packages generated in support of the ring bus. There were 40 new loads energized and 154 existing loads re-energized by the ring bus. In addition, 96 component tests were performed. The transition to “cold and dark” required 15 engineering design control process (NECP) modification packages. The final activity involved the removal of the reserve auxiliary transformers, in which the breakers were to be opened on Friday, September 16, 2016, which would remove the transformers from service.

The licensee had installed two backup diesel generators (1500-kilowatt and 500-kilowatt) to the ring bus. These two diesel generators provided power to critical cold and dark equipment and electrical panels during loss of power events. The inspectors specifically focused on the 1500-kilowatt diesel generator because it was used as a backup to the SFP. The licensee had developed Procedure SO23-2-13.2, “SDG01, 1500kW Diesel Operation,” Revision 1, for energizing and testing the 1500-kilowatt diesel generator. Based on interviews and review of documentation, the inspectors affirmed the licensee was performing the required surveillance of the 1500-kilowatt diesel generator. The licensee was still in the process of reviewing the preventative and corrective maintenance contract prior to its issuance.

Activities were being conducted by the licensee in preparation for San Diego Gas and Electric to install the synchronous condenser in the southern portion of the switchyard. The licensee had relocated the makeup demineralizer piping that ran from the south bluff to the facility. In addition, the licensee had performed scan surveys using an Eberline ASP-1 with a 1”x1” sodium-iodide detector and observed background levels of radioactivity. The preliminary soil samples collected by the licensee indicated no detectable plant related radionuclides. The inspectors reviewed the licensee’s draft radiological characterization plan for the area where the synchronous condenser is planned to be installed. The inspectors concluded that the draft radiological characterization plan satisfactorily met NUREG-1575, “Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)” for a compliant survey. Based on the characterization plan and established data quality objectives, the inspectors concluded that the plan should allow the licensee to integrate the soil data collected under the plan with future soil data collected during the final status survey of the switchyard area. This

should serve to demonstrate that the soils beneath the planned synchronous condenser meet the unrestricted use criteria established under 10 CFR 20.1402.

The inspectors conducted a partial tour of the facility with a certified operator, who simulated how to increase the spent fuel pool level using the newly installed high flow makeup pump 2(3)MP-015. The certified operator utilized licensee Procedure SO23-3.2.11.1, Attachment 4 "Raise Spent Fuel Pool Level with High Flow Makeup Pump." The certified operator walked down the system and demonstrated how to align and operate the high flow makeup pump. The certified operator emphasized that the licensee would normally use the low flow pumps for most situations encountered in the plant. In addition, the inspectors reviewed the training provided to the operations staff on the new spent fuel pool makeup system. The documentation reflected a systematic approach to training through specific objectives, regulatory requirements, schematic flow paths drawings, procedures, and walk-down of equipment. The certified operator demonstrated that the training was successful by his knowledge of the system, the flowrates, and the types of conditions that would require use of the high flow makeup pump 2(3)MP-015 to increase the water level in the spent fuel pools.

1.3 Conclusion

The licensee had completed the cold and dark plant modifications in accordance with the Post-Shutdown Decommissioning Activities Report (PSDAR). 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. The licensee had installed the high flow makeup pump 2(3)MP-015 to support spent fuel pool makeup flow paths and support mitigating strategies for beyond design basis events involving a loss of spent fuel pool inventory.

2 **Spent Fuel Pool Safety (60801)**

2.1 Inspection Scope

The inspectors conducted a review of the spent fuel pools for SONGS Units 2 and 3, specifically the pool water level, chemistry, and associated cooling systems to ensure that the licensee was maintaining the two 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 spent fuel pool 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 spent fuel pool boron concentration be maintained greater than or equal to 2000 parts per million (ppm), respectively. In addition, SONGS UFSAR, Section 9.1.2.3, Safety Evaluation required the spent fuel pool coolant temperature be maintained between 50°Fahrenheit (°F) to 160°F.

At the time of the inspection, both pools had a water level greater than 23 feet over the top of the irradiated fuel assemblies. The SONGS Unit 2 spent fuel pool was at 28 feet and Unit 3 spent fuel pool was at 27.9 feet. The boron concentration was approximately 2721 ppm for Unit 2 and 2708 ppm for Unit 3, based on the samples collected on September 7, 2016. The data was collected on a 7-day surveillance as required by

Technical Specification 3.1.1.1 and 3.1.2.1, respectively. The water level and boron concentration were not below the technical specification requirements.

The licensee indicated that the new spent fuel pool cooling system was holding the temperature of the spent fuel pools in steady temperature conditions. The Unit 2 spent fuel pool was 69.7°F and Unit 3 was 69°F, which was within the range specified in the UFSAR.

The inspectors reviewed the 2016 calendar year-to-date chemistry analysis results for each spent fuel pool and compared the results against the criteria established in the licensee's Procedure SO123-III-1.1.23, "Chemistry Procedure," Revision 66. The primary focus of the spent fuel pool chemistry program is to prevent accelerated degradation of the spent fuel and the pool liner integrity. The chemical parameters analyzed, including the alkaline, earth metals, fluorides, and sulfates were maintained within the normal range established by the licensee's procedure and the technical specifications for boron. The licensee explained that water had been added to the spent fuel pools in July 2016, and the new spent fuel islanding system takes approximately 48 hours to recirculate the entire spent fuel pool. The licensee collected a Unit 3 spent fuel pool chemistry sample on July 13, 2016, in which the results indicated a drop in the boron value to 2192 ppm, which was still above the technical specification of 2000 ppm. A subsequent sample was collected on July 16, 2016, and the boron concentration analysis reflected 2703 ppm. The inspectors review of the boron concentration indicated that the sample results continued to remain steady for the remainder of the period reviewed.

The licensee maintained trends of the chemistry and radioactivity levels for both spent fuel pools. The licensee was tracking a steady increase in radioactivity in both spent fuel pools due to the recent fuel movements in support of the fuel sipping campaign and as a result of no longer using resins to clean the spent fuel pool water. The licensee's procedure specified that the normal range may be exceeded following fuel movement, and to check other parameters for upward trends, when this occurs. The chemistry procedure specified 1.0E-3 microCurie per milliliter (uCi/ml) as the normal range for the gamma isotopic activity parameter. The Unit 3 activity was approximately 8.6E-4 uCi/ml and Unit 2 activity was approximately 2.1E-3 uCi/ml. The licensee was monitoring for any trends and had not identified any upward trend of other spent fuel pool parameters, besides the gamma isotopic activity. The licensee stated that they will continue to monitor and trend the radioactivity of the spent fuel pool as specified by Procedure SO123-III-1.1.23.

The inspectors conducted tours of the two spent fuel pools and observed that housekeeping in the building was satisfactory. The area around the spent fuel pool was posted as a foreign material exclusion area. A raised walkway had been installed around the backside of the SONGS Unit 2 spent fuel pool prior to the previous inspection and a walkway had also been installed around the backside of Unit 3 spent fuel pool. The walkways significantly assisted personnel in traversing to the new spent fuel pool cooling island.

2.3 Conclusion

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.

3 **Fire Protection Program (64704)**

3.1 Inspection Scope

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

3.2 Observations and Findings

Regulation 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 Technical Specifications, Appendix A to the two licenses, states that written procedures shall be established, implemented, and maintained for the fire protection program. Further, License Condition (LC) 2.C(26) for Unit 2 and LC 2.C(27) for Unit 3 requires the licensee to develop and maintain mitigating strategies for addressing large fires and explosions. The inspectors reviewed the licensee's fire protection program for compliance with regulatory and license requirements. The inspectors also reviewed the licensee's mitigating strategies that may have an impact on the fire protection system.

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 provides 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 (Fire Protection Order SO123-FP-1, Revision 25) 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 noted that the procedures had been updated for the current status of decommissioning, although the hot work permit checklist was not clearly defined. The licensee's staff issued Nuclear Notification 203382684 to ensure that the hot work permit checklist was clearly annotated in the applicable procedure.

The inspectors conducted site tours to confirm that the procedure controls were being implemented. In particular, the inspectors toured the areas where the Unit 2 SFP, SFP islanding, and associated electrical switchgear equipment were located. The inspectors concluded that the licensee was effectively controlling combustible material, ignition sources, barriers, and impairments in these areas in accordance with procedure requirements and good housekeeping practices.

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. The licensee recently installed a new fire protection monitoring panel in the control room that monitored critical areas of the plant. A procedure was established to provide the control room operator with instructions for responding to fire and system trouble alarms, which would illuminate on the panel. The inspectors confirmed that the procedure included monitoring of fire-detecting sensors within the vicinity of the SFP and associated support equipment.

Fire suppression systems were in service including water storage tanks, pumps, valves, distribution piping, hose stations, sprinklers, and fire extinguishers throughout the plant. As discussed below, the licensee made changes to the program as the site transitioned from operations to decommissioning. The inspectors observed fire protection equipment in the field and confirmed that plant parameters, including system pressures and tank levels, were within procedural limits. 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 Order (SO123-FP-1, Revision 25) and Section 2.3 of the Updated Fire Hazards Analysis (Revision 29) provide 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 the licensee's program for maintenance and surveillances of fire protection equipment. The licensee established maintenance and surveillance instructions for major plant components. The inspectors 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.

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 smoke clearing fans were staged in various areas to support emergency response operations.

The NRC regulation under 10 CFR 50.48(f) also states, in part, that the licensee shall assess the fire protection program on a regular basis, and the licensee shall revise the fire plan as appropriate throughout the various stages of facility decommissioning. Further, the licensee may make changes to the fire protection program without NRC approval if these changes do not reduce the effectiveness of fire protection for facilities, systems, and equipment that could result in a radiological hazard, taking into account the decommissioning plant conditions and activities. The inspectors reviewed the licensee's assessments and design control of the fire protection system.

Section IV.D.4 of the Fire Protection Order and Sections 2.6 and 2.8 of the Updated Fire Hazards Analysis provide the fire protection audit and self-assessment requirements. The licensee's fire protection program was being routinely audited by the quality assurance program. The last audit was conducted in April 2015. The audit identified one finding, eight weaknesses, and two recommendations. The finding involved a negative trend of procedural non-compliances. The licensee issued Nuclear Notification 203205243 to identify and implement corrective actions for the audit finding. The licensee also conducted self-assessments to supplement the quality assurance audits. The most recent self-assessment was conducted in December 2014. The self-assessment team did not identify any significant deficiencies in the program.

The inspectors also reviewed the licensee's fire protection design control program. The requirements for design and control are provided in Section IV.D.3.a of the Fire Protection Order and Section 2.2.1 of the Updated Fire Hazards Analysis. The main element of the licensee's design control program was the Fire Protection Checklist and Engineering Guidelines (Procedure 90049, "Fire Protection Design Control Program," Revision 10). This procedure included the qualification requirements, design criteria, and documentation requirements. The procedure also included checklists to help the

reviewer determine whether a proposed change in the plant could result in a change to the fire protection program. The inspectors conducted a limited review of several change request documents and confirmed that the checklists had been properly utilized. For example, the implementation of cold and dark modifications impacted the power sources for the existing fire protection equipment. The inspectors determined that the changes did not reduce the effectiveness of the fire protection program and did not require prior NRC approval.

The licensee recently modified the fire protection program by de-energizing the deluge, pre-action, and halon systems within the plant. These sub-systems were no longer required to be operable based on plant conditions. The licensee planned to update all associated documents in the near future to ensure that these changes have been incorporated in the applicable site procedures. The licensee also planned to remove the Units 2 and 3 reserve auxiliary transformers from service immediately after the onsite inspection. After the reserve auxiliary transformers are removed from service, the licensee plans to drain the oil from the transformers. Once the oil has been removed, the licensee no longer has to maintain foam suppression equipment. The licensee is considering removal of its two foam trailers from the site after the transformers have been drained.

The inspectors noted that certain pre-fire plan drawings, used by emergency responders, were not up to date. In particular, several portable fire extinguishers were installed within the plant, but the applicable area drawings did not include these components. The licensee issued Nuclear Notification 203382598 to ensure that the drawings were updated in a timely manner.

Finally, the inspectors reviewed the licensee's mitigating strategies as it involves the fire protection system. Mitigating strategies are used to address wide-area destruction events beyond the design basis of the facility. The mitigating strategies include procedures for fire-fighting and SFP makeup. The primary source of water for SFPs was provided by the two SFP makeup systems that transfer water from the SFP makeup tank to the two SFPs. The second source of water was the three demineralized water storage tanks using either the diesel or gasoline powered portable fire pumps. These pumps could also be used to support fire water system operations during a fire-related emergency. The third source of water was the demineralized water storage tank, located in the north industrial area. If this source of water was used, the licensee would most likely use the diesel powered portable fire pump and transfer the water from the tank to an inlet connection in the respective SFP makeup system. The fourth source of water could be fire water using existing piping or fire hose stations. Fire water would be transferred to the respective SFP through the fire water system piping. The inspectors toured the plant and verified that the fire protection equipment was staged and the tanks contained sufficient water if needed to provide makeup water to the SFPs.

3.3 Conclusions

The inspectors reviewed the licensee's existing fire protection program including implementing procedures, equipment, staffing, training, and design control. The inspectors conducted walk-downs of plant equipment and observed control of combustible materials, housekeeping, and ignition sources. The inspectors concentrated on areas and equipment supporting the SFP and SFP islanding

equipment. In summary, the fire protection program was found to be in compliance with regulatory and license requirements.

4 Emergency Preparedness (82501)

4.1 Inspection Scope

The inspectors performed in-office reviews of the San Onofre Permanently Defueled Emergency Plan, Volume 1, Revision 2, dated August 1, 2016, and Permanently Defueled Emergency Plan Emergency Action Levels, Revision 1 dated June 6, 2016, using inspection Procedure 82501, "Decommissioning Emergency Preparedness Program Evaluation." The inspectors evaluated the licensee's implementation of its emergency preparedness program to determine whether it was being maintained in a status of operational readiness.

4.2 Observations and Findings

The NRC regulations under 10 CFR 50.47, "Emergency Plans" and Appendix E to 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities," continue to apply to nuclear power reactors that have permanently ceased operation and have removed all fuel from the reactor vessel. By letter dated March 31, 2014, (ML14092A332) the licensee requested exemptions from certain emergency planning (EP) requirements of 10 CFR Part 50. The NRC staff performed an assessment of the exemption request as documented in SECY-14-0144, "Request by Southern California Edison for Exemptions from Certain Emergency Planning," dated December 17, 2014, (ML14251A554). The Commission approved the NRC staff's recommendation to grant the exemptions in the staff requirements memorandum to SECY-14-0144, dated March 2, 2015, (ML15061A521). The NRC's approval and its detailed review and technical basis for the specific EP exemptions as requested by the licensee, are provided in the Safety Evaluation Report dated June 4, 2015, (ML15082A204), which became effective immediately.

On March 28, 2016, the licensee generated its 10 CFR 50.54(q)(3) screening and evaluation of the Permanently Defueled Emergency Plan, Volume 1, Revision 2 under Nuclear Notification 203279791. The licensee concluded that the changes were consistent with the NRC approved exemptions, and provided clarification and removed redundancy. These changes went into effect on August 1, 2016.

On June 6, 2016, the licensee generated its 10 CFR 50.54(q)(3) screening and evaluation of the Permanently Defueled Emergency Action Levels, Revision 1 under Nuclear Notification 2032296525. The changes were primarily to provide further clarification for initiating condition PD-AA1 and PD-HU2, editorial changes, and corrections to reflect the Permanently Defueled Emergency Plan. The licensee concluded that the changes did not reduce the effectiveness of the Permanently Defueled Emergency Plan.

On March 30, 2016, the licensee submitted its revised Emergency Plan implementing procedures that included SO123-VIII-ADMIN-1, "Emergency Preparedness Program Maintenance" Revision 2, and SO123-VIII.ERO-6, "Dose Assessment," Revision 1. The licensee completed its 10 CFR 50.54(q)(3) screening and evaluation under Nuclear Notification 203338183 and Nuclear Notification 203252031, respectively. The licensee concluded that the changes did not reduce the effectiveness of the Emergency Plan.

Based on the inspectors review of these revisions, they determined that SONGS did not reduce the effectiveness of the Permanently Defueled Emergency Plan, and that the licensee continued to meet the requirements of 10 CFR 50.45(q)(2) to follow and maintain an emergency plan that met the requirements of 10 CFR Part 50, Appendix E, as exempted and the planning standards provided in 10 CFR 50.47(b), as exempted.

During an assessment, the licensee identified multiple occasions when both Units 2 and 3, wide range gas monitors 2(3)RT7865 were not aligned to the plant vent stack to support one of the approved initiating conditions under Emergency Action Level (EAL) PD-AA1.1, for an Alert declaration. The licensee's Permanently Defueled Emergency Plan required that the licensee maintain the capability to assess, classify, and declare an emergency condition within 30 minutes of the availability of indications that an EAL has been exceeded. Based on the inspectors review of the circumstances surrounding each of these occasions, it was concluded that the licensee was capable of meeting the time requirement for each occasion identified in which the 2(3)RT7865 monitors were not available.

Specifically, this EAL stipulates that a reading on either one of the wide range gas monitors that is equal to, or greater than $1.0\text{E}+08$ microCuries per second ($\mu\text{Ci}/\text{sec}$) for 15 minutes or longer would constitute an initiating condition for PD-AA1, which is a release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 millirem (mrem) total effective dose equivalent (TEDE) or 50 mrem committed dose equivalent (CDE). The readable range for the wide range gas monitors 2(3)RT7865 is $1.0\text{E}-04$ to $1.0\text{E}+08$ $\mu\text{Ci}/\text{sec}$.

However, when 2/3RT7808 was used as the common monitor, its upper detection limit was $4.0\text{E}+07$ $\mu\text{Ci}/\text{sec}$ and therefore, it would be off-scale high and could not be used to detect the Alert threshold. As such, the common monitor 2/3RT7808 is not identified as a viable compensatory measure for the plant vent stack monitors 2(3)RT7865, to assess the Alert threshold.

The licensee initiated Nuclear Notification 203338183 on April 6, 2016. Task Number 002 of the nuclear notification required the licensee to perform a low level event investigation. The licensee performed a thorough investigation, including a sequence of events that identified dates and times when the 2(3)RT7865 monitors were not available for declaration of the PD-AA1.1. The situations when both 2(3)RT7865 monitors were not available occurred several times between October 6, 2015, and November 6, 2015.

The NRC inspectors reviewed each occasion where the 2(3)RT7865 monitors were not available for declaration of the PD-AA1.1. For each occasion, the licensee had the ability and was directed by SO23-15-61.A2, "Alarm Response Instruction," Attachment 2, to secure containment purge and shift the available RT7865 to the plant vent stack. In observing a simulation of the situation, the licensee was capable of securing containment purge and shifting either one of the 2(3)RT7865 monitors to the plant vent stack within the 30 minutes required by the Permanently Defueled Emergency Plan to make an Alert declaration under PD-AA1.1.

The licensee identified the bases for the situation occurring and developed adequate corrective actions. As part of the corrective actions, the licensee identified several procedures that pointed to the Offsite Dose Calculation Manual (ODCM) as the

compensatory action, which directs the use of the common monitor 2/3RT7808 when both 2(3)RT7865 wide range gas monitors are unavailable. This could possibly lead to some situations where both 2(3)RT7865 monitors would be unavailable for longer than 30 minutes and the licensee would inappropriately declare an Alert under PD-AA1.1. Therefore, the licensee made changes to Procedures SO123-VIII-ADMIN-1, "Emergency Preparedness Program Maintenance," Revision 2, and SO123-VIII.ERO-6, "Dose Assessment," Revision 1. The changes included the removal of references to the ODCM and provided acceptable compensatory measures and incorporated instructions to determine source term and perform dose assessment using gaseous sample analysis results when the gaseous radiation monitors were not available. The inspectors review of these two procedures concluded that the changes did not reduce the effectiveness of the Permanently Defueled Emergency Plan and adequately addressed the corrective actions.

The inspectors specifically reviewed the changes made to the licensee's Procedure SO123-VIII.ERO-6, "Dose Assessment," Revision 1, which required gaseous sample collection, analysis, and dose assessment. The inspectors reviewed the training that was developed for the on-shift (non-chemistry) personnel who would be called upon to collect and analyze the gaseous sample. The inspectors concluded that the training was sufficient and the training qualifications for the individuals had been updated to the licensee's electronic qualification information system (eQIS). The inspectors observed operations staff simulate dose assessment and concluded the licensee could satisfactorily collect, analyze, and perform dose assessment to support the emergency preparedness program.

The Nuclear Oversight Division conducted its emergency preparedness audit (SCES 005-16) between July 11, 2016 and July 28, 2016, and issued it on August 25, 2016. This audit was conducted within 12 months of a change to personnel, procedures, equipment, or facilities that potentially could adversely affect emergency preparedness, and therefore met the requirement under 10 CFR 50.54(t). The NRC inspectors reviewed the elements of the audit and determined that the audit covered all of the program elements to satisfy the requirements under 10 CFR 50.54(t). Based on the audit results, the Nuclear Oversight Division determined that the licensee's emergency response organization (ERO) was effective in assuring that adequate protective measures could and would be taken in the event of a radiological emergency. The inspectors reviewed seven Nuclear Oversight assessments of the licensee's emergency preparedness assessments performed in accordance with 10 CFR 50.54(t). The assessments focused on: (1) drill performance; (2) observation of various drill scenarios including: performance of the unannounced/off-hours drill, and environmental exercise that required the collection, preparation, and shipment of samples to an offsite radiological laboratory; and (3) assessment of the planning activities for the independent spent fuel storage installation (ISFSI) only emergency plan (IOEP). The assessments evaluated a number of elements for each activity observed. When an element was determined to be unsatisfactory, the licensee placed it in its nuclear notification tracking program. Based on the inspectors review, the nuclear notifications were adequately addressed. In addition, the drills were used as opportunities for training as applicable, to further develop the skills of the emergency response organization.

In addition, the licensee contracted the Contingency Management Consulting Group to review the post implementation of the Permanently Defueled Emergency Plan and emergency response organization activities. The report was approved for issuance on May 26, 2016. The focus of the review included: (1) maintenance and emergency

preparedness, (2) emergency response organization staffing and augmentation, and (3) emergency action levels and emergency plan changes. The report identified that the licensee was satisfactorily implementing its Permanently Defueled Emergency Plan with only a few weaknesses and recommendations identified. There was one finding, four weaknesses and twelve recommendations identified, all of which the licensee captured in its nuclear notification tracking program.

The inspectors reviewed the licensee's letters of agreement or memorandums of understanding, as appropriate, with Camp Pendleton, Tri-City Medical Center, Mission Hospital, and Air Methods Corporation. These agreements were reviewed on an annual basis by the Emergency Preparedness Manager, as required by the Permanently Defueled Emergency Plan, Section P.3, "Responsibility for Development and Maintenance of the Plan." The inspectors visited the Tri-City Medical Center, located in Oceanside, California. The inspectors met with the Director, Safety and Environment of Care, and the Office Coordinator, Facilities and Construction, both of whom participate in drills with the licensee. Based on interviews and observations of equipment available, it was concluded that the facility was able to respond to multiple contaminated injuries while minimizing contact to other areas of the hospital or with members of the public. The medical center had the capability to contain any radiological wastes for the licensee to take back to the site and maintained a core group of responders who routinely participate in training drills with the licensee.

The licensee was performing its communication checks as required by Section F of the Permanently Defueled Emergency Plan, which implemented planning standard 10 CFR 50.47(b)(6), as exempted. The licensee maintained three emergency kits to support the emergency preparedness program, which were inspected and inventoried quarterly and after each use as required by Section H.9 of the Permanently Defueled Emergency Plan, which implements planning standard 10 CFR 50.47(b)(8), as exempted. The records demonstrated that the licensee identified issues, checked certification dates, and ensured the equipment was available and ready to be used in the event of an emergency. The inspectors observed the contents in each of the kits, which supported operations, radiation protection, and maintenance activities during an actual emergency or drill. Operations staff had self-contained breathing apparatus readily available and operational. The inspectors determined the licensee maintained the required number of operational radios, satellite phones, and backup cell phones to support communications during an emergency.

The licensee was meeting its emergency response organization staffing levels as required by Table B-1 of the Permanently Defueled Emergency Plan. The inspectors observed the licensee identify its emergency response organization members for the respective shift during the daily Operations brief. The inspectors reviewed the list of staff assigned to the emergency response organization roster and determined there was sufficient depth to fill required positions for an extended duration.

4.3 Conclusions

The inspectors concluded that San Onofre Nuclear Generating Station staff appropriately implemented the requirements of 10 CFR 50.54(q)(3) with respect to Permanently Defueled Emergency Plan, Revision 2, Permanently Defueled Emergency Action Levels, Revision 1, and associated procedures. The inspectors did not identify any reductions in the effectiveness of the Permanently Defueled Emergency Plan. The

licensee was implementing its Permanently Defueled Emergency Plan as required and the capability to respond to an emergency was being maintained.

5 Exit Meeting Summary

On September 15, 2016, the NRC inspectors presented the final inspection results to Mr. L. Bosch, Plant Manager, 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.

SUPPLEMENTAL INSPECTION INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

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Project Manager M.Reitzler,
Maintenance
S.Hoque, Chemistry Supervisor
K.Gallion, Emergency Preparedness
J.Appel, Regulatory Affairs
D.Arai, Program Manager F.Pajaro,
Fire Marshall

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 64704	Fire Protection Program
IP 82501	Decommissioning Emergency Preparedness Program Evaluation

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

None

Discussed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CFR	<i>Code of Federal Regulations</i>
mrem	millirem
NRC	Nuclear Regulatory Commission
PDEP	Permanently Defueled Emergency Plan
PSDAR	Post-Shutdown Decommissioning Activities Report
SONGS	San Onofre Nuclear Generating Station
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report

If you have any questions regarding this inspection report, please contact Rachel Browder at 817-200-1452, or the undersigned at 817-200-1197.

Sincerely,

/RA by LEBrookhart Acting for/

Jack E. Whitten, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Docket Nos. 50-361; 50-362
License Nos. NPF-10; NPF-15

Enclosure:
Inspection Report 05000361/2016-005;
05000362/2016-005

w/Attachment: Supplemental Information

Distribution
See next page

ADAMS ACCESSION NUMBER: ML16287A735

■ SUNSI Review By: RSB	ADAMS: ■ <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive ■ <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available ■ <input checked="" type="checkbox"/> Publicly Available	Keyword NRC-002
OFFICE	DNMS/FCDB	DNMS/FCDB	C:FCDB	
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SIGNATURE	/RA/	/RA/	/RA LEBrookhart Acting for/	
DATE	10/13/16	10/14/16	10/14/16	

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Letter to Thomas J. Palmisano from Jack E. Whitten dated October 14, 2016

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION – NRC INSPECTION
REPORTS 05000361/2016005; 05000362/2016005

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