



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

April 28, 2020

Mr. Doug Bauder
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 Independent Spent Fuel Storage
Installation (ISFSI) - NRC Inspection Report 05000206/2020005;
05000361/2020005; 05000362/2020005; AND 07200041/2020001

Dear Mr. Bauder:

This letter refers to the U.S. Nuclear Regulatory Commission's (NRC's) unannounced inspections conducted from January through March 2020 of the dry cask storage activities associated with your Independent Spent Fuel Storage Installation (ISFSI). The NRC inspectors discussed the results of this inspection with you and other members of your staff during a final telephonic exit meeting conducted on April 23, 2020. The inspection results are documented in the enclosure to this letter.

The inspections 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 inspections consisted of selected examination of procedures and representative records, observations of dry cask storage operations, observations of site meetings, and interviews with personnel. Specifically, the inspection reviewed compliance with the requirements specified in the Holtec International HI-STORM UMAX Certificate of Compliance (CoC) No. 1040 and the associated Technical Specifications, the HI-STORM UMAX Final Safety Analysis Report (FSAR), and Title 10 of the Code of Federal Regulations (CFR) Part 72, Part 50, and Part 20. Within the scope of the inspection, no violations were identified and a response to this letter is not required.

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.

D. Bauder

2

If you have any questions regarding this inspection report, please contact Lee Brookhart at 817-200-1549, or the undersigned at 817-200-1249.

Sincerely,

Greg G. Warnick, Chief
Reactor Inspection Branch
Division of Nuclear Materials Safety

Docket Nos.: 50-206; 50-361; 50-362; 72-041
License Nos.: DPR-13; NPF-10; NPF-15

Enclosure:
Inspection Report 05000206/2020005;
05000361/2020005; 05000362/2020005;
and 07200041/2020001

U.S. NUCLEAR REGULATORY COMMISSION REGION IV

Docket Nos.: 50-206; 50-361; 50-362; 72-041

License Nos.: DPR-13; NPF-10; NPF-15

Report No.: 05000206/2020005; 05000361/2020005; 05000362/2020005; and
07200041/2020001

Enterprise Identifier: I-2020-005-0065; I-2020-001-0092

Licensee: Southern California Edison Company

Facility: San Onofre Nuclear Generating Station

Location: San Clemente, CA 92674-02

Inspection Dates: On-site: January 16-18; February 5-6; and March 9-12, 2020

Exit Meeting Date: April 23, 2020

Inspectors: L. Brookhart, Senior ISFSI Inspector
Reactor Inspection Branch
Division of Nuclear Materials Safety, Region IV

E. Love, Senior Transportation and Storage Safety Inspector
Inspection and Oversight Branch
Division of Fuel Management
Office of Nuclear Material Safety and Safeguards, HQ

W. C. Smith, Reactor/ISFSI Inspector
Reactor Inspection Branch
Division of Nuclear Materials Safety, Region IV

Approved By: Greg Warnick, Chief
Reactor Inspection Branch
Division of Nuclear Materials Safety, Region IV

Enclosure

EXECUTIVE SUMMARY

NRC Inspection Report 050000206/2020005; 05000361/2020005; 05000362/2020005; and 07200041/2020001

On January 16-18, February 5-6, and March 9-12, 2020, the U.S. Nuclear Regulatory Commission (NRC) performed a series of unannounced on-site inspections of dry fuel storage activities of the Independent Spent Fuel Storage Installation (ISFSI) at the decommissioning San Onofre Nuclear Generating Station (SONGS) in San Clemente, California. The on-site inspections were augmented through in-office review of the licensee's condition reports, records, procedures, design change evaluation reports, and other materials gathered and provided prior to and after the on-site portion of the inspections through March 31, 2020. The scope of the inspections was to evaluate and review the licensee's actions and performance of dry cask loading operations after the resumption of fuel transfer operations following the extended stoppage in loading due to the August 3, 2018, canister misalignment incident.

For additional discussions and evaluations of the August 3, 2018, incident, see the NRC Special Inspection Report 072-00041/2018-001 and NRC Supplemental Inspection Report 072-00041/2018-002 (NRC's Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML18341A172 and ML19190A217, respectively). For information related to the previous quarters' resumption of fuel loading inspection activities, see NRC Inspection Report 07200041/2019-001; and NRC Inspection Report 07200041/2019-002 (ADAMS Accession Nos. ML19316A762 and ML20049G943, respectively).

Operation of an Independent Spent Fuel Storage Installation, IP 60855

- The inspectors completed numerous unannounced on-site inspections of the licensee's continued fuel loading operations. The inspections were timed such that risk-significant activities were observed. Specifically, the inspectors evaluated and observed selected critical tasks associated with the licensee's spent fuel loading, processing, and downloading operations associated with three canisters during the inspection quarter. The inspectors noted that the corrective actions taken in response to the August 2018 incident remained effective. The licensee continues to implement successful programs related to training, procedures, equipment maintenance, and oversight to ensure safe and compliant downloading operations. The inspectors observed that the status of the canisters during downloading operations were constantly monitored and properly handled to avoid possible misalignment issues. No findings were identified during the inspection period. (Section 1.2)

Review of 10 CFR 72.48 Evaluations, IP 60857

- The inspectors reviewed a sample of 10 CFR 72.48 screenings that had been performed within the inspection period. No findings were identified during the selected sample review. (Section 2.2)

REPORT DETAILS

Summary of Facility Status

The San Onofre Nuclear Generating Station (SONGS) Independent Spent Fuel Storage Installation (ISFSI) consists of two ISFSI designs located adjacent to each other: the Orano Transnuclear (TN) Nuclear Horizontal Modular Storage (NUHOMS) system and the Holtec International Storage Module Underground Maximum Capacity (HI-STORM UMAX) system. The TN ISFSI contains a total of 63 advanced horizontal storage modules (AHSMs) on the NUHOMS ISFSI pad. Fifty-one of the AHSMs are loaded with the stainless steel dry shielded canisters (DSCs). Spent fuel from all three reactors are stored in 50 of the AHSMs. Greater-than-Class-C (GTCC) waste from the Unit 1 reactor decommissioning project was stored in the 51st module. The twelve empty AHSMs will be available for storage of additional GTCC waste from decommissioning the Units 2 and 3 reactors. The 24PT1-DSCs (Unit 1 fuel) are loaded and maintained under Amendment 0 of Certificate of Compliance (CoC) No. 72-1029 and the 24PT4-DSCs (Units 2 and 3 fuel) are loaded and maintained under Amendment 1 of CoC No. 72-1029. Both CoC amendments were being maintained under NUHOMS Final Safety Analysis Report (FSAR), Revision 5.

The HI-STORM UMAX ISFSI portion was designed to hold 75 Holtec multi-purpose canisters (MPCs). The Holtec MPC-37 canister design can hold 37 pressurized water reactor fuel assemblies in accordance with UMAX CoC No. 72-1040, Amendment 2; HI-STORM UMAX FSAR, Revision 4; and the HI-STORM Flood and Wind (FW) FSAR, Revision 5. Dry cask storage operations had resumed in July 2019, after an 11-month safety stand-down in operations following an August 3, 2018, canister misalignment incident at the UMAX ISFSI. At the end of the inspection period (March 31, 2020), the licensee had loaded 56 canisters into the UMAX ISFSI.

1. Operation of an Independent Spent Fuel Storage Installation (IP 60855)

1.1 Inspection Scope

The inspectors performed a review of the licensee's ISFSI activities to verify compliance with requirements of the Holtec UMAX CoC No. 72-1040, Amendment 2; HI-STORM UMAX FSAR, Revision 4; and the HI-STORM Flood and Wind (FW) FSAR, Revision 5. The inspectors reviewed selected procedures, corrective action reports, and records to verify ISFSI operations were compliant with the license Technical Specifications and the Holtec UMAX FSAR.

1.2 Observations and Findings

Loading Operations

The inspection included three unannounced on-site visits. The inspection was timed such that risk-significant activities were observed. Specifically, the inspectors evaluated and observed the critical tasks associated with the licensee's spent fuel loading, processing, and downloading operations.

The unannounced on-site inspection dates were as follows:

On-site inspection period	MPC Canister No.
January 16-18, 2020	MPC #46
February 5-6, 2020	MPC #49
March 9-12, 2020	MPC #54

On January 16, 2020, during the download process of lowering MPC #46 into its below ground storage vault, four sequential underload alarms were received from the rigging equipment. The load sensing devices and underload alarms were added to the rigging equipment on the mobile crane as one of the corrective actions in response to the August 2018 incident. After each alarm, the crew made fine adjustments to the mobile crane positioning to improve the alignment of the canister over the vault. These adjustments were made to prevent additional underload alarms, however, the canister downloading was not successful within the four attempts allowed by procedure. The purpose of these alarms is to notify operators that the mobile crane was not supporting the full weight of the canister, which is approximately 100,000 lbs. The underload alarms are set to alarm when the weight of the canister decreases by more than 15,000 lbs.

By design, the Holtec UMAX system used at SONGS has very small clearances of less than half an inch between the outside of the canister and the vault's shield ring. These small clearances between the canister and the vault are desirable for seismic design considerations. While incidental contact and underload alarms are undesirable, these operating characteristics are an anticipated occurrence during the downloading process. As a result of the underload alarms, the licensee halted work to perform inspections to determine the cause of the underload alarms.

To facilitate an inspection for the causes of the alarms, it was necessary to deliberately remove the MPC from the vault. That evening, the MPC was raised to a position above the top of the mating device and the mating device drawer was closed. The MPC was supported by the Vertical Cask Transporter (VCT) during this duration and secured within the Transfer Cask. The next morning, the NRC responded by dispatching an inspector to observe the licensee's activities and associated corrective actions. On January 17, 2020, the inspector observed the licensee transport the MPC away from the underground storage vault using the VCT and the inspector performed an independent inspection of the vault. Within the underground storage vault, it was evident that the bottom of the MPC was contacting a gusset on the shield ring. Engineering assessments concluded that the force on the shield ring gusset did not adversely impact the safety of the MPC or the vault. In response to the issue, the licensee re-positioned the VCT over the center of the underground storage vault, adjusted the vertical cask transporter lift tower heights, and re-leveled the MPC. The inspector observed the licensee successfully download MPC #46 by the early morning of January 18, 2020.

The inspectors also observed downloading operations for MPC #49 and MPC #54. The inspectors observed the licensee's continued implementation of previous improvement changes related to the downloading process that were in effect during the last NRC inspection (ADAMS Accession No. ML20049G943). The inspectors noted the licensee's use of cameras mounted on the mating device and a video display to assist centering

the MPC, ensured that the canisters were traveling in a downward motion. The additional cameras allowed the ability to inspect for foreign material within the interference areas and verification that the MPCs were lowered below the mating device drawer. The licensee continued to refine their downloading process and procedures, such that there were no trial and error adjustments required for MPC #49 or #54. No findings were identified during inspections of the licensee's loading activities.

Corrective Action Program

NRC inspectors performed a review of SCE's Corrective Action Program (CAP) associated with ISFSI operations, including the cask handling cranes. The inspectors reviewed a sample set of Action Requests (ARs) generated since the last inspection period which ended December 31, 2019. Several ARs were selected by the inspectors for further review. The inspectors noted that the ARs covered a broad range of issues that were identified during ISFSI operations, and that the licensee's corrective actions related to downloading alignment issues continued to be effective and complied with Procedure HPP-2464-400, "MPC Transfer at SONGS," Revision 29.

Based on the range and types of problems identified, the licensee continued to demonstrate a low threshold for placing issues into its CAP. The actions taken for the resolution of the issues were appropriate to address the problems that were identified.

No significant trends were identified during the review of the CAP at SONGS. The ARs were processed in accordance with procedure SO123-XV-50, "Corrective Action Program," Revision 45. No findings were identified related to the ARs reviewed.

1.3 Conclusions

The inspectors completed numerous unannounced on-site inspections of the licensee's continued fuel loading operations. The inspections were timed such that risk-significant activities were observed. Specifically, the inspectors evaluated and observed selected critical tasks associated with the licensee's spent fuel loading, processing, and downloading operations associated with three canisters during the inspection quarter. The inspectors noted that the corrective actions taken in response to the August 2018 incident remained effective. The licensee continues to implement successful programs related to training, procedures, equipment maintenance, and oversight to ensure safe and compliant downloading operations. The inspectors observed that the status of the canisters during downloading operations were constantly monitored and properly handled to avoid possible misalignment issues. No findings were identified during the inspection period.

2 Review of 10 CFR 72.48 Evaluations (IP 60857)

2.1 Inspection Scope

Two (2) licensee 10 CFR 72.48 screenings were reviewed to determine compliance with regulatory requirements.

2.2 Observations and Findings

The licensee performed several procedure revisions under the 10 CFR 72.48 process since the last inspection. NRC inspectors reviewed the 10 CFR 72.48 screenings for those procedure changes and design change packages made within the ISFSI program. Specifically, the inspectors reviewed changes to implement procedural changes with respect to the site's Forced Helium Dehydration (FHD) drying operations.

The FHD drying system consists of a closed-loop system using helium to remove residual moisture in the MPC cavity after the bulk water has been drained. The inspectors reviewed the recent design changes implemented by the licensee to improve the efficiency of the FHD drying operations. The changes included drying the MPC by reversing the flow direction (helium in through the drain line and out through the vent port) and reducing the system's pressure and subsequent temperature to enter a superheated condition earlier in the drying process. The inspectors noted the FSAR does not distinguish or set precedence for flow direction or drying manipulations to achieve the required dryness criteria.

With respect to superheated condition, the inspectors noted the FSAR referenced a document, "Holtec FHD Sourcebook" (HI-2022966), that serves as the repository of the concepts and underlying analysis of the FHD technology. The inspectors noted the FHD analysis described in the sourcebook was performed using a normal operating pressure condition of 20-55 psig. The licensee's design change lowered the pressure to a range of 10-20 psig while maintaining a positive pressure on the system to prevent ingress of air into the system if there were a leak in the process piping. The inspectors noted the FHD operating maximum temperature limits of 450°F was maintained in the design change to ensure the spent fuel cladding temperature limits would not be exceeded (752°F for high burnup fuel and 1058°F for moderate burnup fuel).

To address both reverse flow and different superheat conditions, Holtec initiated an Engineering Change Order (e.g., 72.48 review) to revise site procedures; Holtec Information Bulletin (HIB), No. 72, "Flow Direction during FHD Operations," to describe the process and recommendations to licensees; and Response to Request for Technical Information (RRTI), No. 2464-076, to provide justifications for operation of the FHD system outside the FHD Sourcebook normal operating range. Overall, the inspectors noted adequate justifications to change the drying operation to reverse flow the helium and adjust the superheat operating conditions while ensuring adequate MPC dryness.

None of the screenings led to a full 10 CFR 72.48 safety evaluation. All screenings reviewed were determined to be adequately evaluated.

2.3 Conclusions

The inspectors reviewed a sample of the licensee's required 10 CFR 72.48 screenings that had been performed within the inspection period. No findings were identified during the selected sample review.

3 Exit Meeting Summary

On April 23, 2020, the inspectors presented the final inspection results to Mr. Doug Bauder, Vice President and Chief Nuclear Officer, Southern California Edison, and other members of the licensee's staff.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

A. Bates, Regulatory and Oversight Manager
M. Morgan, Regulatory and Oversight
M. Orewyler, Senior ISFSI Manager
J. Smith, Project Manager, Holtec
K. Wilson, Engineer

INSPECTION PROCEDURES USED

IP 60855 Operation of an Independent Spent Fuel Storage Installation
IP 60857 Review of 10 CFR 72.48 Evaluations

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

None

Closed

None

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AHSM	Advanced Horizontal Storage Modules
AR	SCE Action Request
CAP	Corrective Action Program
CFR	<i>Code of Federal Regulations</i>
CoC	Certificate of Compliance
DSC	Dry Shielded Canisters
GTCC	Greater-than-Class-C
FHD	Forced Helium Dehydration
FSAR	Final Safety Analysis Report
HIB	Holtec Information Bulletin
HI-STORM FW	Holtec International Storage Module Underground Flood and Wind
HI-STORM UMAX	Holtec International Storage Module Underground Maximum Capacity
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
NRC	U.S. Nuclear Regulatory Commission
NUHOMS	Nuclear Horizontal Modular Storage
MPC	Multi-purpose canister
RRTI	Response to Request for Technical Information
SCE	Southern California Edison
SONGS	San Onofre Nuclear Generating Station
TN	Orano Transnuclear
VCT	Vertical Cask Transporter

SAN ONOFRE NUCLEAR GENERATING STATION INDEPENDENT SPENT FUEL STORAGE
 INSTALLATION (ISFSI) - NRC INSPECTION REPORT 05000206/2020005;
 05000361/2020005; 05000362/2020005; AND 07200041/2020001 DATED – APRIL 28, 2020

DISTRIBUTION:

SMorris, ORA	MKotzales, NMSS
MShaffer, ORA	WAllen, NMSS
MMuessle, DNMS	JWeil, NMSS
LHowell, DNMS	AMoreno, OCA
GWarnick, DNMS	JQuichocho, RIV/ETS
LBrookhart, DNMS	R4DNMS_RIB
ESimpson, DNMS	
WCSmith, DNMS	

cc:

Mr. Al Bates, Regulatory Affairs Manager
 Southern California Edison Company
 San Onofre Nuclear Generating Station
 P.O. Box 128
 San Clemente, CA 92674-0128
AL.BATES@sce.com

Mr. Gonzalo Perez, Branch Chief
 Radiologic Health Branch
 Division of Food, Drug, & Radiation Safety
 CA Dept. of Health Services
 P.O. Box 997414, MS 7610
 Sacramento, CA 95899-7414

Mr. Lou Bosch, Plant Manager
 Southern California Edison Company
 San Onofre Nuclear Generating Station
 P.O. Box 128
 San Clemente, CA 92674-0128
Lou.Bosch@sce.com

Mr. David Hochschild, Chair
 California Energy Commission
 1516 Ninth Street (MS 34)
 Sacramento, CA 95814

Mr. W. Matthews III, Esquire
 Southern California Edison Company
 Law Department
 2244 Walnut Grove Avenue
 Rosemead, CA 91770

Doug.Bauder@sce.com

Electronic Distribution for SONGS

ADAMS ACCESSION NUMBER: ML20119A876

SUNSI Review By: LEB	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:RxIB	NMSS:IOB	DNMS:RxIB	DNMS:RxIB
NAME	LBrookhart	E. Love	WCSmith	GWarnick
SIGNATURE	/RA/	/RA/	/RA/	/RA/
DATE	4/28/2020	4/27/2020	4/28/2020	4/28/2020

OFFICIAL RECORD COPY