



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

November 22, 2019

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) INSPECTION REPORT 050-00206/2019-003, 050-00361/2019-005, 050-00362/2019-005, 072-00041/2019-001

Dear Mr. Bauder:

This letter refers to the U.S. Nuclear Regulatory Commission's (NRC's) unannounced inspections conducted from July 2019 through September 2019, 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 October 21, 2019. 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 inspection consisted of selected examination of procedures and representative records, observations of site meetings, performance of independent radiation measurements, and interviews with personnel. Specifically, the inspections reviewed compliance with the requirements specified in the Holtec International HI-STORM UMAX Certificate of Compliance 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.

During the on-site inspections, the NRC observed and confirmed that site personnel completed all required corrective actions identified through causal evaluations for the August 3, 2018, canister misalignment incident to return to fuel loading and transfer operations. Specifically, the NRC inspectors conducted unannounced on-site inspections to evaluate the classroom training, pre-operational training exercises, and a significant number of fuel loading, processing, and dry cask storage transfer evolutions. The NRC inspectors concluded the corrective actions were effectively implemented to ensure the safe transfer of spent fuel to the site's ISFSI.

Based on the results of these inspections, the NRC documented one violation of NRC requirements. The violation was determined to be a Severity Level IV violation of low safety significance under the NRC's traditional enforcement process. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy. 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 Lee Brookhart at 817-200-1549, or the undersigned at 817-200-1249.

Sincerely,

/RA/

Greg 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 050-00206/2019-003;
050-00361/2019-005; 050-00362/2019-005;
072-00041/2019-001
w/Attachment

cc w/enclosure:
A. Bates, SONGS
L. Bosch, SONGS
W. Matthews, SONGS
G. Perez, CA Dept. of Health
D. Hochschild, CA Energy Commission

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.: 050-00206/2019-003; 050-00361/2019-005;
050-00362/2019-005; and 072-00041/2019-001

Enterprise Identifier: I-2019-005-068; I-2019-001-0133

Licensee: Southern California Edison Company

Facility: San Onofre Nuclear Generating Station

Location: San Clemente, CA 92674-012

Inspection Dates: On-site: July 1-3, 8, 10-11, 15-18, and 22-28; August 12-14, 19-23,
and 28; and September 24, 2019

Exit Meeting Date: October 21, 2019

Inspectors: Lee Brookhart, Senior ISFSI Inspector
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Accompanied by: Vincent Gaddy, Acting Deputy Director
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 Supplemental Inspection Report 050-00206/2019003; 050-00361/2019005; 050-00362/2019005; and 072-00041/2019001

On July 1-3, 8, 10-11, 15-18, and 22-28; August 12-14, 19-23, and 28; and September 24, 2019, 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, and other materials gathered and provided prior to and after the on-site portion of the inspections through October 21, 2019. The scope of the inspection was to evaluate and review the licensee's actions related to the resumption of fuel transfer operations from the Unit 2 and Unit 3 spent fuel pools to dry storage following an 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 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, and 072-00041/2018-001 and Notice of Violation and NRC Supplemental Inspection Report 050-00206/2018-006, 050-00361/2018-006, 050-00362/2018-006, and 072-00041/2018-002 (NRC's Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML18341A172 and ML19190A217, respectively).

During the on-site inspections, the NRC observed and confirmed that the licensee completed all required corrective actions from the licensee's causal evaluations to return to fuel loading operations. Dry cask storage operations were performed in an atmosphere that was free from schedule pressures with an emphasis on procedure adherence. The NRC inspectors verified that the corrective actions implemented were effective to ensure the safe transfer of spent fuel to the site's ISFSI.

Operation of an Independent Spent Fuel Storage Installation, IP 60855

- Several on-site evaluations of the licensee's classroom training lessons and pre-operational dry run training exercises were completed by the inspectors during the inspection period. The inspectors confirmed the corrective actions from the licensee's causal evaluations were adequately implemented regarding licensee oversight, enhanced procedures, and use of new equipment and personnel. The completion of training and dry run exercises of personnel and the demonstration of the newly implemented oversight structure confirmed the licensee was effective in implementing all corrective actions to ensure the safe resumption of fuel loading operations. (Section 1.1)
- The inspectors completed numerous unannounced on-site inspections of the licensee's return to fuel loading operations. The inspections included near 24-hour coverage to evaluate and observe the critical tasks associated with the licensee's spent fuel loading, processing, and downloading operations. The inspectors confirmed the workers were qualified and trained under the licensee's new training program. The procedures utilized in the transfer operations contained the new quantitative and qualitative steps to ensure important tasks were adequately accomplished. During downloading operations, the licensee's operations contained the required new personnel, new equipment, and additional oversight to safely place a canister into the UMAX ISFSI. The inspectors determined the licensee was adequately implementing all required corrective actions from the causal

evaluations and the status of the canisters during downloading was constantly monitored and properly handled to avoid any possible misalignment issues. (Section 1.2)

- The inspectors determined that the licensee was placing all relevant identified issues into the Southern California Edison Corrective Action Program (CAP). A large detailed list of issues placed into the site's CAP was reviewed by inspectors and it was determined that the site had established a low threshold of identifying concerns/issues and placing them into the CAP for proper review and resolution. A few of the issues placed into the licensee's CAP, during the inspection period, are further discussed in this report. From all the condition reports reviewed, the inspectors determined the licensee was taking adequate corrective actions to resolve the issues and were appropriately performing reviews for extent of cause and extent of condition when required. (Section 1.3)

Follow-up of Events and Notices of Enforcement Discretion, IP 71153

- The inspectors documented one Severity Level IV, non-cited violation (NCV) related to Licensee Event Report (LER) 2018-002-0 (ADAMS Accession No. ML19050A170), which was previously reviewed and discussed in NRC Supplemental Inspection Report 072-00041/2018-002. Specifically, the violation related to the licensee's failure to conduct past low-profile transporter operations, from January 2018 through August 2018, in accordance with the station's site-specific seismic analysis. The NRC determined that the finding was of low safety significance since the licensee had performed an additional analysis for a revision to the LER 2018-002-1 (ADAMS Accession No. ML19221B590), which bounded any potential contact that could have occurred during a postulated seismic event. The inspectors concluded that the potential impact from adjacent structures (such as light posts) to the conveyance and the loaded transfer cask during a postulated seismic event would not have exceeded any design basis requirements. The licensee had restored compliance prior to resumption of fuel loading activities by revising the transportation procedure to ensure requirements from the site-specific seismic analysis were clearly followed and painted lines along the ISFSI haul path to provide visual boundaries during spent fuel transport operations. The original and revised LERs are closed. (Section 2.2)

Review of 10 CFR 72.48 Evaluations, IP 60857

- Safety screenings had been performed in accordance with the licensee's procedures and 10 CFR 72.48 requirements. All screenings and evaluations reviewed were determined to have been adequately evaluated. (Section 3.3)

REPORT DETAILS

Summary of Plant Activities

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 the decommissioning 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. The licensee had 35 canisters stored at the UMAX ISFSI at the end of inspection period. 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.

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

1.1 Dry Run and Training Evolutions

a. Inspection Scope

The NRC performed numerous unannounced on-site inspections to evaluate, observe, and assess the licensee's corrective actions following the 11-month stop in fuel movement due to the August 3, 2018, canister misalignment incident.

On July 1-3, 8, and 10-11, 2019, the inspectors observed the licensee successfully complete specific pre-operational dry runs and training of crew personnel on the procedures that were revised based on corrective actions from the licensee's causal evaluations. These dry run demonstrations and training qualifications for crew personnel were targeted on specific evolutions from the revised Procedures HPP-2464-400, "MPC Transfer at SONGS," Revision 22 and HPP-2464-500, "MPC Unloading at SONGS," Revision 8.

The dry run operations observed by the NRC included MPC simulator travel inside the transfer cask on the low-profile transporter from the fuel building along the delineated haul path to the UMAX ISFSI pad, transfer of the transfer cask from the low-profile transporter to the vertical cask transporter (VCT), travel of the VCT up and onto the

ISFSI pad, alignment and securing of the transfer cask to the mating device, and downloading/uploading of the MPC simulator into and out of the UMAX ISFSI vault.

In addition, inspectors periodically observed classroom training while on-site and verified worker qualifications for crews performing dry run training and for workers that had previously completed the exercises.

b. Observations and Findings

The inspectors observed six classroom training lessons under the newly implemented training program. The classroom training was established to qualify the workers to perform fuel transfer operations. The classroom training contained detailed discussions and presentations to ensure all qualified workers understood and were knowledgeable of the changes made in the licensee's transport procedures. The training reviewed the licensee's new oversight structure in place, the new equipment that was required to be used, and the new personnel additions, including their roles and responsibilities. The classroom attendees were attentive, and the classroom environment was interactive with the students actively participating throughout the lessons.

During the observed dry run evolutions, the inspectors were able to observe implementation for several layers of corrective actions as described in the licensee's causal evaluations. Licensee oversight personnel were present at all times during MPC simulator transfer operations as required by the revised oversight task guides. Additional crew personnel and newly implemented canister monitoring equipment (camera, video monitors, and load monitoring devices) were successfully utilized during the training evolutions. The crew followed the new procedures to complete the dry runs. The downloading procedure was revised to include new quantitative and qualitative steps that ensured important tasks were adequately accomplished.

All licensee identified observations, concerns, and issues gathered during the dry run training exercises were captured and placed into the licensee's corrective action program (CAP). The collection of action reports (ARs) were reviewed by the inspectors and were confirmed to be adequately resolved. Resolution of items included additional procedural revisions to enhance the process and additional training on subjects for the crew. The inspectors confirmed the licensee's attention to placing issues into the site's CAP was appropriate and the licensee had established a low-threshold to properly identify, address, and correct issues of concern which could lead to conditions adverse to quality.

c. Conclusions

Several on-site evaluations of the licensee's classroom training lessons and pre-operational dry run training exercises were completed by the inspectors during the inspection period. The inspectors confirmed the corrective actions from the licensee's causal evaluations were adequately implemented regarding licensee oversight, enhanced procedures, use of new equipment and personnel, and placing issues into the licensee's CAP. The completion of training and dry run exercises of personnel and the demonstration of the newly implemented oversight structure confirmed the licensee was effective in implementing all corrective actions to ensure the safe resumption of fuel loading operations.

1.2 Spent Fuel Loading Operations

a. Inspection Scope

This ISFSI inspection included near 24-hour coverage of the loading operations for the critical tasks associated with the licensee's first few canister loading and transfer operations. Inspectors from NRC Region IV office and NRC's Headquarters' Division of Fuel Management observed operations to evaluate and confirm the licensee's corrective actions were being implemented and were effective to ensure safe processing and transport of spent fuel to the site's ISFSI. The inspectors reviewed selected procedures and records to verify ISFSI operations were compliant with Holtec CoC No. 72-1040 license Technical Specifications and the Holtec UMAX FSAR.

On July 15-18, 2019, inspectors observed the transport and downloading of MPC #30 into the SONGS UMAX ISFSI. This canister had been seismically restrained and stored in the Unit 3 fuel building since the August 3, 2018, canister misalignment incident. The NRC inspectors observed operations which included transport of the loaded transfer cask to the UMAX ISFSI and downloading of the canister into the UMAX ISFSI vault.

On July 22-28, 2019, inspectors observed the loading of MPC #31 in the SONGS Unit 2 fuel building. This was the first complete fuel loading operation conducted at SONGS since the August 3, 2018, canister misalignment event. The inspectors observed and evaluated critical evolutions which included 24-hour coverage on fuel movements and fuel verification, heavy lifts associated with the fuel building crane, welding and nondestructive testing of the canister lid-to-shell closure operations, hydrostatic pressure testing, forced helium dehydration, helium backfill, vent/drain port cover welding and nondestructive testing, helium leak testing, radiological surveys, transport of the loaded transfer cask, and downloading of the canister into the UMAX ISFSI vault.

On August 12-14, 19-23, and 28, 2019, inspectors followed-up on the status of site activities and observed the loading of MPC #32. The inspectors provided near 24-hour coverage of the loading operations which included fuel preparation activities, spent fuel movements, heavy lifts associated with the fuel building crane, welding and nondestructive testing of the canister lid-to-shell weld, hydrostatic pressure testing, forced helium dehydration, helium backfill, vent/drain port cover welding and nondestructive testing, helium leak testing, radiological surveys, transport of the loaded transfer cask, and downloading of the canister into the UMAX ISFSI vault.

On September 24, 2019, inspectors reviewed the status of condition reports that had been initiated for recent dry cask storage operations, observed activities related to the processing of MPC #35, and observed the preparations for transport of MPC #34 which was scheduled to be downloaded during the week.

b. Observations and Findings

Throughout the numerous unannounced on-site inspections, the inspectors confirmed that corrective actions associated with the causal evaluations from the August 3, 2018, canister misalignment incident were adequately implemented and effective during the site's return to fuel transfer operations. The inspectors reviewed selected training records to verify work personnel had completed the new training requirements prior to participating in the operations. Through interviews with the crew and loading operation

supervisors, the inspectors confirmed individuals were knowledgeable and competent in their designated roles and responsibilities. The inspectors verified that pre-job briefs and on-the-job-site drills were conducted and contained pertinent information to ensure the crews were prepared to perform and accomplish the critical tasks of each operation.

The inspectors confirmed that revised loading procedures contained the enhanced procedure requirements identified and corrected during the causal evaluation period. These procedure enhancements provided quantitative and qualitative steps to ensure important tasks were adequately accomplished. Additionally, the licensee had performed numerous procedure revisions to capture additional lessons learned from the dry run exercises to enhance the loading operations. The inspectors observed that the dry cask storage operations were performed in an atmosphere that was free from schedule pressures with an emphasis on procedure adherence. During all observed downloading operations, the site adequately implemented all previously identified corrective actions to ensure a misalignment during downloading was avoided or properly resolved.

The inspectors observed and evaluated that the licensee was implementing the new oversight strategies as described in the site's oversight program. The inspectors observed that the licensee implemented multiple layers of oversight participation and provided direct surveillances on all critical activities. The oversight program consisted of three layers of contractor surveillance. The initial layer of licensee oversight was comprised of a contractor technical representative (CTR) which worked alongside each of the vendor's Cask Loading Supervisors (CLS) to perform the work activities. The CTR served in a role of assisting the contractors to meet common goals, facilitate a look ahead perspective, assist with implementation of procedure and safety enhancements, provide coaching, steer evolutions to correct discovered gaps, help resolve issues, and identify areas of improvement.

The second layer of oversight consisted of an oversight specialist (OS). Each shift contained multiple OSs to provide surveillances and assessments on critical activities which were defined in the SCE Procedure G-XV93-PTP, "Pool to Pad Desktop Guide." The OS responsibility includes, evaluating vendor performance for adherence to procedures, capturing issues to place into the corrective action program, providing a holistic approach to ensure conditions different than normal would be recognized, documenting concerns and lessons learned, ensuring the resolution of issues placed in the licensee's CAP, and conducting paired observations and peer observations of other oversight personnel.

The third layer of oversight included personnel from SCE's nuclear quality oversight office which performed independent oversight surveillances and assessments on the vendor's, the CTRs', and the OSs' activities. The inspectors confirmed that each layer of oversight was participating, surveilling, and assessing, as required in the operations that the NRC observed. The inspectors observed that the licensee had established an oversight program that was highly effective in ensuring all activities followed the required procedures, addressed issues of concern and placed issues adverse to quality into the CAP, identified weaknesses and trends that could be improved, and thoroughly took responsibility to ensure operations were performed in a safe and controlled manner.

During the downloading operations, the inspectors confirmed that the operations included the additional trained personnel which were strategically placed in key locations

on man-lifts and on and around the VCT to ensure monitoring of the canister was accomplished as it was lowered into the UMAX vault. The downloading crews utilized the new load monitoring equipment (camera, video monitor, load sensing shackles, wireless headsets, and wireless weight monitoring) to ensure the weight of canister, the position of the canister, and the status of lowering was always known and properly communicated to the crew, supervisors, and oversight. The process to move the spent fuel canister into the UMAX ISFSI was performed in a safe manner over several hours while using the licensee's enhanced procedures and careful observations by the required licensee oversight individuals.

c. Conclusions

The inspectors completed numerous unannounced on-site inspections of the licensee's return to fuel loading operations. The inspections included near 24-hour coverage to evaluate and observe the critical tasks associated with the licensee's spent fuel loading, processing, and downloading operations. The inspectors confirmed the workers were qualified and trained under the licensee's new training program. The procedures utilized in the transfer operations contained the new quantitative and qualitative steps to ensure important tasks were adequately accomplished. During downloading evolutions, the licensee's operations contained the required new personnel, new equipment, and additional oversight to safely place a canister into the UMAX ISFSI. The inspectors determined the licensee was adequately implementing all required corrective actions from the causal evaluations and the status of the canister during downloading was constantly monitored and properly handled to avoid any possible misalignment issue.

1.3 Corrective Actions

a. Inspection Scope

The inspectors reviewed licensee and vendor corrective action reports that had been initiated since the NRC supplemental inspection that concluded in June of 2019. The inspectors reviewed the reports to ensure the issues were being properly addressed, resolved, and the extent of condition or the extent of cause were determined. Additionally, inspectors reviewed the reports to determine if the licensee had addressed causal evaluation corrective actions which included lowering the threshold to place issues into the CAP and that all ISFSI vendor issues on-site would be captured in the SCE CAP.

b. Observations and Findings

The licensee implemented corrective actions to ensure all ISFSI issues with the possibility of being averse to quality were placed into SCE's CAP. The inspectors reviewed a large list of ARs that had been initiated since the last NRC inspection. The detailed list of issues placed into the site's CAP demonstrated the site had established a low threshold of identifying concerns/issues and placing them into the CAP for proper review and resolution. During classroom training lessons, the inspectors verified the new training material included presentations to the crew, supervisors, and oversight to contain a heightened attention for identifying problems and placing them into the SCE CAP.

The inspectors selected ARs for additional review and observed that the conditions described in the ARs were properly addressed, the resolutions were identified to contain the proper corrective actions, and the resolutions addressed extent of condition and extent of cause, when required. Noteworthy condition reports selected by the inspectors for additional follow-up are described below.

Mating Device Closure

One condition report, AR 0719-60949, documented a procedural violation that occurred after the downloading of MPC #30 had been completed on July 18, 2019. During the evolution to remove the Transfer Cask from the stack up configuration, an individual from the cask loading crew inadvertently allowed a portion of their body to cross under the cone of influence of the suspended heavy load (empty transfer cask). The Cask Loading Supervisor (CLS) immediately suspended operations to make the required notifications, initiate condition reports, and discuss the worker's actions with licensee oversight and the crew. During a stand-down meeting to discuss the industrial safety issue with the crew, licensee senior oversight personnel and vendor senior supervisors questioned the CLS if the mating device drawer was in a fully open or partially open position.

Licensee Procedure HPP-2464-400 contained a conservative limit on the time frame that the mating device drawer could be closed. Steps 7.7.8 - 7.7.12 required that the "Mating Device must be removed, or the drawer [fully] opened to establish air cooling [for the MPC] within 4 hours," following downloading and after removing the transfer cask from the stack-up configuration. The CLS was aware of the 4-hour time limitation but had directed the crew to close the drawer approximately half way during the break period for foreign material intrusion concerns. Once it was identified that the drawer was only partially opened, and did not meet the procedure requirement to be fully open, the licensee took immediate corrective actions to fully open the drawer to comply with the procedure.

The licensee estimated that the drawer had been either closed or partially opened for a timeframe of 4 hours and 38 minutes which exceeded the 4-hour time limit in the procedure.

The licensee took immediate corrective actions to place the issue of failing to follow procedure requirements into their corrective action program. In addition, the licensee initiated an event investigation, requested a thermal evaluation from the vendor, and provided training to the cask loading crew and loading oversight staff.

The new thermal analysis from the vendor was initiated to verify the canister did not exceed any design basis limit and evaluate whether the 4-hour procedure time limit for the Mating Device drawer position was appropriate. The UMAX FSAR Section 4.4 and Table 4.1.2 stated the design basis canister (highest thermal canister) would have a peak cladding temperature of 693 °F under normal long-term operations inside the UMAX vault. The canisters loaded at SCE were well below that maximum kW limit (30 kW was the maximum canister loaded at SONGS verses the allowed maximum design basis of approximately 34 kW). The analysis provided by the vendor demonstrated that with the drawer fully closed for 8 hours, the peak cladding temperature, based on the site-specific heat loads, would only rise 27 °F from the steady-state condition. This analysis verified that an 8-hour time limit would still maintain

peak cladding temperatures well below NRC's dry canister peak cladding temperature limits of 752 °F. Additionally, the thermal evaluation confirmed that MPC #30 had never approached nor exceeded any design basis limit from the FSAR.

The inspectors reviewed results of the event investigation, the new thermal analysis, actions taken to train the crew, and the revisions to the procedure. The inspectors confirmed that the partial-closure of the drawer for 38 minutes beyond the conservative time-limit placed in the licensee's procedure, had no effect on the condition of spent fuel and did not cause the canister to exceed any normal operating temperature limit described in the FSAR. Additionally, the licensee's procedure change to extend the time-limit to 8 hours was acceptable and would still preclude a canister from exceeding any established design basis limit described in the FSAR.

The NRC determined this failure to follow a procedure requirement constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. This procedure violation was minor because the limit exceeded was a conservative limit. The FSAR normal operating temperature limits were never approached and the safety significance of exceeding the procedural limit was minor.

Multi-Purpose Canister Storage

During the inspection period, one issue the inspectors closely monitored involved the discovery of rainwater inside some of the unused MPC-37 canisters that were stored at the SONGS site. The two storage areas used at the site included a laydown area inside the owner controlled protected area (PA) and a staging area in Parking Lot #4, adjacent to the site. Both locations were outdoors and subject to ambient environmental conditions.

An SCE oversight individual, while performing routine surveillances of Holtec's activities, initiated AR 0119-19778 in January 2019 which detailed that water had been observed pooling and collecting on the covers of MPCs stored on-site at SONGS, at both storage locations. The licensee determined that the possibility of water intrusion into MPCs being stored at SONGS needed to be addressed and evaluated for impacts to MPC cleanliness and storage requirements.

The likelihood of rainwater intrusion into stored MPC canisters was considered to be low because the MPCs were wrapped in several layers of polymer vapor barrier, had a water tight cap installed, and included a water proof tarpaulin cover that was folded completely over the tops of the stored MPCs. This low likelihood was supported by an initial investigation of an MPC with pooling water on its cover that was inspected in the owner-controlled PA. The inspection showed that no water or corrosion products were present inside of that MPC. Based on those preliminary results, the licensee and Holtec determined that water intrusion was not a problem for any of the other MPCs stored at SONGS.

However, starting in April 2019, the licensee initiated several condition reports that identified that some of the protective barriers and coverings on the MPCs had failed. Specifically, the licensee discovered moisture behind the green vapor barrier sheeting during inspections performed by the licensee. Further inspection identified that the Velcro closures in the MPC tarpaulin covers had failed under the pressure of rainwater pooling on top. The pooling rainwater seeped past the Velcro closures and into the MPC

cavity. The licensee's investigation determined that the protective covers used for the on-site storage of the MPCs failed due to environmental conditions during their prolonged (eleven month) time outdoors. The water identified inside the MPCs had the potential to create adverse conditions, therefore, the condition reports required that an engineering evaluation be performed to determine the effects of moisture intrusion on all MPCs in long term storage and to determine a solution for the problem.

The canisters stored at SONGS were in the possession of Holtec International, the dry cask storage vendor performing pool to pad spent fuel services for the licensee. All unused staged canisters were required to be controlled in accordance with Holtec's Quality Assurance Program. The licensee, SCE, takes possession of the spent fuel canisters as they are placed into service to store the licensee's spent fuel. As such, the licensee performed its inspections of the MPC storage conditions through its contractor oversight role. The licensee worked with Holtec to address the identified issues.

Holtec Procedure HSP-315, "Packaging Shipping Storage of Fabricated and Finished Products," Revision 12, detailed the storage requirements for MPCs. The MPCs at SONGS were to be stored in accordance with the requirements of ANSI 45.2.2, "Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants," Level C requirements. For Level C storage, Holtec Procedure Step 6.4.3.7.a, stated that items stored in a marine environment shall be stored in a temperature and humidity-controlled building to prevent condensation. However, Step 6.4.3.7.b states that if indoor storage facilities are unavailable, items shall be thoroughly wrapped in a vapor barrier to prevent moisture intrusion.

Holtec issued a condition report (FCR 2464-1417) to address the discovery of degraded MPC protective coverings at SONGS. Holtec issued Response to Request for Technical Information (RRTI) 2464-072 which contained recovery actions that required MPC cleaning and flushing operations. Holtec directed the use of Holtec Procedures HSP-314, "Cleaning of Fabricated Component and Finished Products," Revision 14, and HPP-2464-622, "MPC Cleaning at SONGS," Revision 0, to return the canisters to a Class C cleanliness level as required by ANSI N45.2.1 criteria.

Holtec initiated an MPC flushing, cleaning, and inspection operation to return the MPC canisters to vendor delivered specifications. The canister cleaning operations took place in an open area near the turbine deck so that the turbine deck crane could be used to lift, upend, and manipulate the MPC canisters that required flushing and cleaning. The MPCs were strapped into an Up-ENDER, a rig configured to allow the MPC to be fully supported during crane manipulations. The crane allowed the MPC to be positioned onto cribbing that tilted the MPC opening slightly downwards so that the water used in the flushing operations could freely flow into a catch basin. Flushing took place at SONGS using deionized water. The water collected in the catch basin was sampled after the flushing was complete. The water was chemically analyzed to ensure there was no unacceptable chemical contaminants left after the flushing operations.

The inspectors observed the condition of MPCs being stored at SONGS on August 12-14, 2019. At the time of the NRC inspection, Holtec had completed the inspection activities for 14 MPCs of approximately 42 MPCs stored in Parking Lot #4 and in the owner-controlled PA. Ten of the 14 MPCs had standing water at the bottom of the fuel basket. The standing water ranged from 0.5 to 24 inches. The inspectors observed some cleaning operations during its August 19-23, 2019, fuel loading inspection at

SONGS. During these inspections, NRC verified the rainwater and any possible particulates were removed during the flushing operations. The cleaned MPCs were being assessed using ANSI N45.2.1 standards prior to being returned to storage or used in fuel loading operations.

The inspectors concluded that the licensee was performing frequent and thorough surveillances of activities on-site. The licensee was capturing potential issues and adequately resolving those issues through the site's CAP. The actions to clean, flush, analyze, and disposition the canister to meet all applicable requirements prior to use were effective and adequate.

In response to the water intrusion issues, NRC identified a potential issue regarding Holtec's adherence to Holtec Procedure HSP-315, "Packaging, Shipping, and Storage of Fabricated and Finished Products," Revision 12, that occurred at the SONGS site. The inspectors determined that dry cask storage vendor, Holtec, was responsible for MPC storage activities at the site. As such, NRC Region IV has forwarded this issue of concern to the Inspection and Oversight Branch, Division of Fuel Management, for review.

c. Conclusions

The inspectors determined that the licensee was placing all relevant identified issues into the SCE CAP program. A large detailed list of issues placed into the site's CAP was reviewed by inspectors and it was determined that the site had established a low threshold for identifying concerns/issues and placing them into the CAP for proper review and resolution. The inspectors further determined the licensee was taking adequate corrective actions to resolve the issues including a review for extent of cause and extent of condition when required.

2 Follow-up of Events and Notices of Enforcement Discretion (IP 71153)

2.1 Inspection Scope

The inspectors evaluated licensee events to verify the licensee's response and corrective actions were adequate to restore compliance. The inspectors reviewed licensee event reports (LERs) to ensure the reports were timely, accurate, included the required information, and that the required corrective actions had been completed.

2.2 Observations and Findings

a. (Closed) Licensee Event Report 2018-002-0 and 2018-002-1, Spent Nuclear Fuel Transport Conveyance Vehicle Operated Outside Obstacle Clearance Limits

Licensee Event Report 2018-002-0, dated February 14, 2019 (ADAMS Accession No. ML19050A170) was previously discussed in the NRC Supplemental Inspection Report dated July 9, 2019 (ADAMS Accession No. ML19190A217). In the LER, the licensee identified that transporter's center of gravity was not maintained within limitations specified in the site's specific analysis and operations had been conducted too close to adjacent structures (light posts). These past operations were determined to be outside the calculated clearance limits specified in the site's seismic analysis. The licensee identified that the site procedures, at the time, did not provide sufficient detail to

comply with the seismic stability calculation. No actual seismic incidents or collisions with obstacles occurred during past fuel transfer operations and there was no impact to plant personnel or public health and safety. The LER 2018-002-0, at the time, described that an analysis was still in progress to determine if past operations were acceptable.

On August 6, 2019, SCE issued an updated LER 2018-002-1 (ADAMS Accession No. ML19221B590) in accordance with 10 CFR 72.75(d)(1) and (g) for past operations of the low-profile-transporter. The revised LER described that the licensee had performed additional seismic analysis and concluded that there were no safety consequences for traveling along the ISFSI haul route with reduced seismic clearances to adjacent structures and obstacles (light posts). The NRC reviewed the LER revision's additional analysis that bounded any potential contact that could have occurred to the transporter and transfer cask during a postulated seismic event and concluded that the potential impact would not exceed any design basis requirements.

Inspectors found that the updated LER contained adequate content to be closed out in this inspection report. No seismic events have occurred that resulted in damage to the low-profile-transporter or transfer cask during the fuel transfer campaign that began in January 2018. The licensee's failure to follow the site-specific seismic analysis, for past operations, was determined by inspectors to be a violation of NRC requirements (Section 2.2.b). These LERs are closed.

b. Finding Related to the Licensee's Event Report

The licensee's event notification EN #53798 documented that past low-profile transporter (HI-PORT) operations had not been conducted within the requirements of the original seismic evaluation HI-2167363, "Seismic Stability Analysis of HI-TRAC on HI-PORT at SONGS," Revision 4. At times the low-profile-transporter was operated outside of the 10-inch travel height restriction of the seismic analysis. Also, the proximity distance to adjacent structures was never formally outlined along the haul path from the fuel buildings to the ISFSI pad. Evaluation HI-2167363, Section 5.0, "Conclusions," stated that the loaded HI-PORT height should be setup to have a maximum clearance of 10 inches between the dropdeck and haul path and a minimum clearance of 32 inches should be maintained between the outer edges of the HI-PORT and adjacent safety related structures or structures that may adversely affect the HI-PORT along the haul path at all times.

Title 10 CFR 72.212(b)(3), requires, in part, that the general licensee shall ensure that each cask used conforms to the terms, conditions, and specifications of a Certificate of Compliance as listed in 10 CFR 72.214.

Title 10 CFR 72.214 states, in part, that Certificate Number 1040 [Docket Number 072-01040] Amendment Number 2, effective date January 9, 2017, is an approved cask for storage of spent fuel under the conditions specified in the Certificate of Compliance for the Holtec HI-STORM UMAX Storage System.

Certificate of Compliance 072-01040, Appendix B, Technical Specification 3.4.15 requires, in part, the loaded transfer cask and its conveyance shall be evaluated to ensure, under the site-specific Design Basis Earthquake (DBE), that the cask and its conveyance does not tip-over or slide off the haul route.

Contrary to the above, from January 30, 2018, to August 3, 2018, the licensee failed to ensure the cask and its conveyance was evaluated under the site-specific DBE. Specifically, the licensee identified that past HI-PORT transportation operations were not evaluated under the site-specific DBE, since operations were conducted outside the height and stand-off requirements in seismic evaluation HI-2167363.

This violation was dispositioned per the traditional enforcement process using Section 2.3 of the NRC's Enforcement Policy. The NRC determined that the finding was of low safety significance since the licensee had re-performed the evaluation, addressed the deviation that occurred, and demonstrated the canister and its conveyance would not have tipped over, slipped off, or experienced damage beyond design basis requirements along the haul route during those transportation operations due to being operated outside of the identified limits. This finding was determined by inspectors to be of more than minor safety significance, since if left uncorrected, the deficiency could lead to a more significant safety concern.

Consistent with the guidance in Section 1.2.6.D of the NRC Enforcement Manual, if a violation does not fit an example in the Enforcement Policy Violation Examples, it should be assigned a severity level: (1) commensurate with its safety significance; and (2) informed by similar violations addressed in the Violation Examples. The violation was evaluated to be similar to a Severity Level IV violation in Enforcement Policy Section 6.1.d.1.

The licensee entered the finding into its CAP as AR 1218-46759. The licensee restored compliance, before fuel loading resumption activities, by (1) changing the transportation procedure to ensure requirements from the site-specific seismic analysis were clearly outlined and followed, (2) painting lines along the ISFSI haul path to provide visual boundaries that the HI-PORT operator should not cross during spent fuel transport operations, and (3) revising the site-specific seismic analyses to bound transportation operations conducted at the site. Because the licensee entered the issue into its CAP, the safety significance of the issue was low, and the issue was not repetitive or willful, this Severity Level IV violation was treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy (NCV 07200044/2019-001-01; "Failure to Ensure the Loaded Transfer Cask and its Conveyance was Evaluated Under the Site-Specific DBE" (10 CFR 72.212(b)(3)).

2.3 Conclusions

The inspectors documented one Severity Level IV, non-cited violation (NCV) related to the licensee's failure to conduct past transportation operations, utilizing the low-profile transporter, in accordance with the station's site-specific seismic analysis. The NRC determined that the finding was of low safety significance since the licensee had performed an additional analysis for a revision to the LER which bounded any potential contact that could have occurred during a postulated seismic event. The inspectors concluded that the potential impact to the transfer cask would not have exceeded any design basis requirements. The licensee restored compliance, prior to fuel loading resumption activities, by changing the transportation procedure to ensure requirements from the site-specific seismic analysis were clearly outlined and followed and revised the site-specific seismic analyses to bound transportation operations conducted at the site. The original and revised LERs are closed.

3 Review of 10 CFR 72.48 Evaluations (IP 60857)

3.1 Inspection Scope

The licensee's 10 CFR 72.48 screenings and evaluations performed since the NRC's last ISFSI inspection (ADAMS Accession No. ML19190A217) were reviewed to determine compliance with regulatory requirements.

3.2 Observations and Findings

The licensee's 10 CFR 72.48 screenings and evaluations for ISFSI program changes since June 2019 were reviewed to determine regulatory compliance. The licensee had performed a number of procedure revisions and some equipment or process changes under the 72.48 process since the last inspection. NRC inspectors reviewed the 72.48 screens for those procedure changes and design change packages made within the ISFSI program. None of the screens led to a full 10 CFR 72.48 safety evaluation. All screenings were determined to be adequately evaluated.

3.3 Conclusions

All required safety screenings and safety evaluations had been performed in accordance with procedures and requirements of 10 CFR 72.48. All screenings and safety evaluations reviewed were determined to have been adequately evaluated.

4 Exit Meeting Summary

On October 21, 2019, the NRC 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. The licensee acknowledged the issues presented.

SUPPLEMENTAL INSPECTION INFORMATION

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J. Smith, Project Manager, Holtec
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INSPECTION PROCEDURES USED

IP 60855 Operation of an Independent Spent Fuel Storage Installation
IP 71153 Follow-up of Events and Notices of Enforcement Discretion
IP 60857 Review of 10 CFR 72.48 Evaluations

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

07200044/2019-001-01	NCV	Failure to Ensure the Loaded Transfer Cask and its Conveyance was Evaluated Under the Site-specific DBE
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Closed

2018-002-0	LER	Spent Nuclear Fuel Transport Conveyance Vehicle Operated Outside Obstacle Clearance Limit, Revision 0
2018-002-1	LER	Spent Nuclear Fuel Transport Conveyance Vehicle Operated Outside Obstacle Clearance Limit, Revision 1

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AHSM	Advanced Horizontal Storage Module
ANSI	American National Standards Institute
AR	SCE Action Request
CAP	Corrective Action Program
CFR	<i>Code of Federal Regulations</i>
CLS	Holtec Cask Loading Supervisor
CoC	Certificate of Compliance
CTR	SCE Contractor Technical Representative
DBE	Design Basis Earthquake
DSC	Dry Shielded Canister
EN	Event Notification
FCR	Holtec Field Condition Report
FSAR	Final Safety Analysis Report
GTCC	Greater than Class C
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
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
NUHOMS	Nuclear Horizontal Modular Storage
MPC	multipurpose canister
OS	SCE Oversight Specialist
PA	Protected Area
RRTI	Response to Request for Technical Information
SCE	Southern California Edison
SONGS	San Onofre Nuclear Generating Station
TN	Orano Transnuclear
VCT	Vertical Cask Transporter

NRC INSPECTION REPORT 050-00206/2019-003, 050-00361/2019-005, 050-00362/2019-005,
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