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

November 28, 2018

EA-18-155

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: NRC SPECIAL INSPECTION REPORT 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001 AND NOTICE OF VIOLATION

Mr. Bauder:

This letter refers to the Special Inspection conducted on September 10-14, 2018, at your facility in San Clemente, California. The inspection was conducted in response to the misalignment of a loaded spent fuel storage canister as it was being downloaded into the storage vault at the San Onofre Nuclear Generating Station (SONGS). Based on the criteria specified in Management Directive 8.3, "NRC Incident Investigation Program," the Nuclear Regulatory Commission (NRC) initiated a Special Inspection in accordance with Inspection Procedure 93812, "Special Inspection." The basis for initiating the Special Inspection and the focus areas for review are detailed in the Special Inspection Charter (Enclosure 3), dated August 17, 2018 (Agencywide Document Access and Management System (ADAMS) Accession ML18229A203).

The enclosed report documents the results of the inspection. The inspectors discussed the preliminary inspection findings with Mr. Thomas Palmisano and members of your staff on September 14, 2018, at the conclusion of the onsite portion of the inspection. A final exit briefing was conducted telephonically with Mr. Palmisano and members of your staff on November 1, 2018.

Based on the results of the Special Inspection, two apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The circumstances surrounding these apparent violations, the significance of the associated issues, and the need for corrective actions were discussed with Mr. Palmisano at the conclusion of the onsite inspection and during the final telephonic exit briefing. The apparent violations involved the failure to: (1) ensure important-to-safety equipment was available to provide redundant drop protection features for a spent fuel canister during downloading operations; and (2) make a timely notification to the NRC Headquarters Operations Center for the August 3, 2018, disabling of important-to-safety equipment.

The NRC is concerned about apparent weaknesses in management oversight of the dry cask storage operations. Your staff did not perform adequate direct observational oversight of downloading activities performed by your contractor, ensure adequate training of individuals responsible for performing downloading operations, provide adequate procedures for downloading operations, or ensure that conditions adverse to quality were entered into the corrective action program. The NRC identified that a causal factor for the misalignment incident involved management weakness in the oversight of dry cask storage operations.

Before the NRC makes its enforcement decision, we are providing you with an opportunity to: (1) request a predecisional enforcement conference (PEC) or (2) request alternative dispute resolution (ADR). If a PEC is held, it will be open for public observation and the NRC will issue a press release to announce the time and date of the conference.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a PEC does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision.

The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in NRC Information Notice 96-28, “Suggested Guidance Relating to Development and Implementation of Corrective Action,” may be helpful and can be obtained at the NRC Web site at http://pbadupws.nrc.gov/docs/ML0612/ML061240509.pdf.

In lieu of a PEC, you may also request ADR with the NRC in an attempt to resolve this issue. Alternative dispute resolution is a general term encompassing various techniques for resolving conflicts using a neutral third party. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral mediator works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues.

Additional information concerning the NRC’s program can be obtained at http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html. The Institute on Conflict Resolution at Cornell University has agreed to facilitate the NRC's program as a neutral third party. Please contact the Institute on Conflict Resolution at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of these issues through ADR. Alternative dispute resolution sessions are not conducted with public observation though the outcome of the ADR agreement is made public.

A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter. Please contact Dr. Janine F. Katanic at 817-200-1151 within 10 days of the date of this letter to notify the NRC of your intended response.

In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

The NRC determined that three Severity Level IV violations of NRC requirements occurred. These violations were evaluated in accordance with Section 2.2.2 of the NRC Enforcement Policy. The NRC determined the issuance of a Notice of Violation (Notice) is appropriate because the actions to restore compliance have not been fully developed and implemented, and the actions must be effective prior to beginning fuel handling activities.

The three Severity Level IV violations are cited in the enclosed Notice and the circumstances surrounding them are described in detail in the subject inspection report. The violations involved failures to: (1) identify conditions potentially adverse to quality for placement into your corrective actions program; (2) establish an adequate program for training, proficiency testing, and certification for individuals involved in downloading operations; and (3) provide adequate procedures for dry cask storage operations involving downloading operations.

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

If you have any questions concerning this matter, please contact Dr. Janine F. Katanic, CHP, of my staff at 817-200-1151.

Sincerely,

/RA/

Troy W. Pruett, Director
Division of Nuclear Materials Safety

Docket Nos.: 50-206; 50-361; 50-362; 72-041
License Nos.: DPR-12; NPF-10; NPF-15

Enclosures:
1. Notice of Violation
2. NRC Special Inspection
   Report 050-00206/2018-005,
   050-00361/2018-005,
   050-00362/2018-005
   072-00041/2018-001
3. Special Inspection Charter dated
   August 17, 2018 (ML18229A203)

NOTICE OF VIOLATION

Southern California Edison Company
San Clemente, CA

Docket Nos.: 050-00206, 050-00361, 050-00362, 072-00041
License Nos.: DPR-12; NPF-10; NPF-15
EA No.: 18-155

During an NRC Special Inspection conducted September 10 through November 1, 2018, three violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

A. 10 CFR 72.172 requires, in part, that, licensees establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, and deviations, are promptly identified and corrected.

   Contrary to the above, from January 30 to August 3, 2018, the licensee failed to establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, and deviations, were promptly identified and corrected. Specifically:

   1. On July 22, 2018, the loading crew experienced difficulty in aligning canister 28 for downloading into the independent spent fuel installation vault. However, the licensee failed to enter this deviation in downloading conditions into its corrective action program to determine the cause of the misalignment problem and develop corrective actions to preclude reoccurrence.

   2. From January 30 to August 3, 2018, during canister downloading, contact between the canister and vault components frequently occurred. However, the licensee failed to enter instances of contact into its corrective action program and perform an assessment to disposition the exterior conditions of the downloaded canisters and vault components.

This is a Severity Level IV violation (NRC Enforcement Policy Section 6.3).

B. 10 CFR 72.192 requires, in part, that the licensee establish a program for training, proficiency testing, and certification of independent spent fuel installation personnel.

   Contrary to the above, from January 30 to August 3, 2018, the licensee failed to establish an adequate program for training, proficiency testing, and certification of all independent spent fuel installation personnel. Specifically:

   1. The training program failed to adequately train and certify the rigger/spotter position involved in the important to safety downloading operation.

   2. The training program for the vertical cask transporter operator position failed to have adequate proficiency testing on the controls related to the load indicating device and downloading operations.

This is a Severity Level IV violation (NRC Enforcement Policy Section 6.3).

C. 10 CFR 72.150, requires, in part, that the licensee prescribe activities affecting quality by documented instructions or procedures of a type appropriate to the circumstances and must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, from January 30 to August 3, 2018, the licensee failed to prescribe activities affecting quality by documented instructions or procedures of a type appropriate to the circumstances and include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically:

1. Procedure HPP-2464-400, "Multi-Purpose Canister Transfer at SONGS," Revision 15, step 7.6.23, failed to provide qualitative and quantitative directions for the vertical cask transporter operator to monitor control panel indications that would identify a canister had become misaligned during downloading operation.

2. Procedure HPP-2464-400, "Multi-Purpose Canister Transfer at SONGS," Revision 15, step 7.6.23, failed to include adequate instructions for the rigger/spotter to monitor the downloading slings for a slack condition.

This is a Severity Level IV violation (NRC Enforcement Policy Section 6.3).

Pursuant to the provisions of 10 CFR 2.201, Southern California Edison Company is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 1600 E. Lamar Blvd., Arlington, Texas 76011, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

This reply should be clearly marked as a "Reply to a Notice of Violation, EA-18-155" and should include, for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued requiring information as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Your response will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the public without redaction.

If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information).

Dated this 28th day of November 2018

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-206; 50-361; 50-362; 72-041
License Nos.:	DPR-12; NPF-10; NPF-15
Report No.:	050-00206/2018005; 050-00361/2018005; 050-00362/2018005; and 072-00041/2018001
EA No.:	18-155
Licensee:	Southern California Edison Company
Facility:	San Onofre Nuclear Generating Station
Location:	San Clemente, CA 92674-012
Inspection Dates:	Onsite September 10-14, 2018 In-office review through November 1, 2018
Exit Meeting Date:	November 1, 2018
Inspectors:	Eric Simpson, CHP, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety, Region IV Marlone Davis, Senior Inspector Inspections and Operations Branch Division of Spent Fuel Management W. Chris Smith, Reactor Inspector Engineering Branch 1 Division of Reactor Safety, Region IV
Accompanied By:	Janine F. Katanic, PhD, CHP, Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety, Region IV Patricia Silva, Chief Inspections and Operations Branch Division of Spent Fuel Management Troy W. Pruett, Director Division of Nuclear Materials Safety, Region IV
Approved By:	Troy W. Pruett, Director Division of Nuclear Materials Safety, Region IV
Attachment:	Supplemental Inspection Information

EXECUTIVE SUMMARY

NRC Special Inspection Report 050-00206/2018005; 050-00361/2018005; 050-00362/2018005; and 072-00041/2018-001

On September 10-14, 2018, the U.S. Nuclear Regulatory Commission performed an announced Special Inspection of the independent spent fuel storage installation at the decommissioning San Onofre Nuclear Generating Station in San Clemente, California. The inspection continued with an in-office review of training material, licensee analyses, procedures, and other materials gathered during the onsite inspection through November 1, 2018. The Southern California Edison Company, the licensee and owner of San Onofre Nuclear Generating Station, has an NRC General License for its independent spent fuel installation under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72. The scope of the inspection was to evaluate the facts and circumstances involved in the August 3, 2018, misalignment incident, and review the licensee's follow-up investigation, causal evaluation, and planned corrective actions.

NRC Special Inspection of San Onofre Nuclear Generating Station Canister Misalignment Incident of August 3, 2018

- The licensee's actions that led to disabling the important to safety downloading slings and removal of redundant drop protection features were identified as an apparent violation of Technical Specification 5.2.c.3 requirements. (Section 3.1.1)

- The NRC team identified missed opportunities where the licensee could have addressed the potential for a downloading misalignment. For example, on July 22, 2018, one of the crews experienced misalignment difficulty resulting in a prolonged downloading operation. The licensee did not enter the adverse condition into the corrective action program to determine the cause and develop appropriate corrective actions. This was identified as a Severity Level IV violation of 10 CFR 72.172 requirements. (Section 3.1.1)

- Personnel lacked the proper training, proficiency testing, and certifications to operate important to safety equipment. This was identified as a Severity Level IV violation of 10 CFR 72.192 requirements. (Section 3.1.2)

- Dry cask storage procedures did not provide adequate directions for how to determine the downloader slings were slack. Slack in the slings was an indicator of a loss-of-load. Further, procedures did not include qualitative or quantitative means to determine when a canister had become misaligned. These procedure inadequacies were identified as a Severity Level IV violation of 10 CFR 72.150 requirements. (Section 3.1.3)

- No licensee or contractor oversight staff were in direct visual observation of important to safety activities during downloading operations on August 3, 2018. Licensee oversight was not a part of communications between the cask loading supervisor, the rigger/spotter, and vertical cask transporter operator during downloading operations. (Section 3.1.3)

- The licensee concluded and the NRC agreed that the minor removal of divider shell coating during downloading operations did not affect the design functions for shielding,

structural, and thermal safety functions. The licensee's plan to address future inspection of the divider shells in their aging management program is acceptable. (Section 3.1.4)

- The licensee failed to make the required 24-hour NRC notification of the August 3, 2018, incident where important to safety equipment was disabled when required to mitigate the consequences of an accident and no redundant equipment was available to perform the safety function. This failure was identified as an apparent violation of 10 CFR 72.75(d) requirements. (Section 3.1.4)

- The causal evaluations performed by the licensee and its contractor identified apparent and root causes for the August 3, 2018, canister misalignment incident that included inadequate training, inadequate procedures, poor utilization of the corrective action program, and insufficient management oversight. (Section 3.1.5)

- The licensee's consequence analysis resulting from a hypothetical 25-foot canister drop determined that the canister integrity would be maintained. The NRC will continue to inspect the licensee's consequence analysis. (Section 3.1.5)

- The licensee provided an analysis to demonstrate that wear on canister 29 during the downloading incident would meet established acceptance criteria. The NRC determined that more analysis was required to accept that the canister meets design requirements. This charter item will be reviewed during a future NRC inspection. (Section 3.1.6)

- All associated corrective actions for the August 3, 2018, incident had not been fully developed and implemented by the licensee. The NRC will review the licensee's revised procedures, training plans, equipment modifications, and performance testing (dry runs) of its dry cask storage operations during a future inspection to determine the effectiveness of corrective actions for the incident. (Section 3.1.7)

REPORT DETAILS

1 Inspection Scope

On September 10-14, 2018, the NRC performed an announced Special Inspection at the San Onofre Nuclear Generating Station (SONGS) in San Clemente, California, which was followed by in-office reviews of additional information provided by the licensee through November 1, 2018. The scope of the inspection was to interview personnel associated with the August 3, 2018, misalignment incident to independently evaluate the circumstances of the canister misalignment; identify and review all pertinent records, documents, and procedures related to the licensee's downloading operations; evaluate procedure adequacy and adherence; evaluate the reportability requirements; and to evaluate the root cause analyses and corrective actions to prevent recurrence.

2 Background

2.1 General Description of Multi-purpose Canister Downloading Operations

On November 8, 2018, the NRC conducted a public meeting webinar (NRC's Agencywide Documents Access and Management System (ADAMS) Accession ML18319A139). The presentation provides a summary of a downloading operation.

A vertical cask transporter (VCT) is used for transporting the transfer cask and multi-purpose canister (MPC or canister) loaded with spent fuel onto the independent spent fuel storage installation (ISFSI) pad. Dry cask storage workers manipulate the VCT to align the transfer cask over the ISFSI vertical ventilated module (VVM or vault) in which the canister will be stored. Once alignment has been achieved and the transfer cask is securely bolted to a mating device, the transfer cask is disconnected from the VCT. Lifting slings are connected to the top of the canister and the VCT overhead lift beam. The VCT lift beam is raised until the load of the canister is supported and no longer resting on the bottom of the transfer cask.

While the canister is being supported by the lift beam and slings, a drawer on the mating device is opened. Once the drawer is open, the VCT operator lowers the lift beam, which lowers the canister into the storage vault. The VCT can be moved during the download to make fine adjustments for canister alignment within the vault. While the canister is being lowered, it passes through a divider shell assembly. The divider shell has a shield ring that the canister must pass through as it is being lowered into the vault. When fully downloaded, the canister will be seated on a pedestal in the cavity enclosure container in the vault.

2.2 August 3, 2018 Canister Misalignment

On August 3, 2018, as the loaded canister was being lowered into the vault, personnel failed to notice that the canister was misaligned. The licensee and its contractor continued to lower the VCT lift beam until staff believed that the canister had been fully lowered to the bottom of the vault. Staff involved in the download failed to recognize the lifting slings were slack. A radiation protection technician identified radiation readings that were not consistent with a fully lowered canister. The licensee then identified that

the loaded spent fuel canister was resting on a shield ring near the top of the vault, preventing it from being lowered, and that the rigging and lifting slings were slack and no longer bearing the load of the canister.

With the slings slack, the lifting equipment was no longer capable of performing its important to safety function of holding and controlling the loaded canister. The canister could have experienced an approximately 17-18 foot drop into the storage vault if the canister had slipped off the shield ring. This load drop accident is not a condition analyzed in the dry fuel storage system's Final Safety Analysis Report (FSAR).

The licensee restored the control of the load to the slings and lifting devices. The estimated time the canister was in an unsupported position was approximately 45 minutes. The licensee repositioned and lowered the canister into the vault. The licensee subsequently halted all dry fuel storage movement operations in order to fully investigate the incident and develop corrective actions to prevent recurrence.

The licensee informed Region IV staff of the misalignment incident on August 6, 2018. Region IV discussed the licensee's plans for evaluation and follow-up for the incident and the status of fuel loading operations. The licensee agreed to suspend fuel loading operations until such time as their senior management was satisfied with their corrective actions, the NRC completed their inspection, and the NRC determines that corrective actions are sufficient to prevent a similar occurrence. Region IV chartered a Special Inspection Team to review the incident, any relevant background information, causal and risk assessments conducted by the licensee, and proposed and completed corrective actions.

3 Special Inspection Charter (IP 93812)

3.1 Inspection Scope

Following the notification to NRC Region IV of the August 3, 2018, misalignment incident, the NRC evaluated the information provided against the criteria for a reactive inspection. Based on the criteria in Management Directive 8.3, "NRC Incident Investigation Program," and Inspection Manual Chapter 0309, "Reactive Inspection Decision Basis for Reactors," a decision was made to perform a Special Inspection. The Special Inspection Charter is provided in Enclosure 3.

The Special Inspection was conducted onsite from September 10-14, 2018, and continued with in-office review until November 1, 2018. The Special Inspection focused on understanding the August 3, 2018, misalignment incident. The inspection included interviewing personnel involved in the incident, developing a timeline, and assessing the licensee's immediate corrective actions.

The sections below provide inspection details for each of the Special Inspection Charter items.

3.1.1 Charter Item 5

Inspection Scope

"Interview personnel associated with the August 3, 2018, misalignment incident to develop a timeline to ensure the licensee's investigation contained all necessary information to identify all contributing factors and develop adequate corrective actions."

The NRC team interviewed licensee and contractor staff involved or present during the August 3, 2018, misalignment incident. The NRC also reviewed records related to dry cask storage operations.

Observations and Findings

Based on interviews and records reviewed, the following timeline was developed:

Date/Time (± 30 minutes)	Activity
August 3, 2018	
12:40 p.m.	Downloading begins for canister 29: All dry cask storage supervision and licensee oversight, including radiation protection staff exited the ISFSI pad to stand in a low-dose area on the ISFSI pad ramp (approximately 150 feet away from the operations). Only the rigger/spotter in the motor-powered boom lift device man-basket (JLG) and the VCT operator remained on the ISFSI pad.
1:05 p.m.	VCT operator and rigger/spotter notify cask loading supervisor (CLS) that the canister has been fully lowered into the ISFSI vault.
1:12 p.m.	The radiation protection technician (RPT) determines radiation levels indicate that the canister was not fully lowered. Work activities were stopped to plan recovery actions with the radiation protection supervisor and CLS. The rigger in charge (RIC) began making preparations to enter the JLG.

1:15 p.m.	Notifications were made to Holtec management.
	The RIC was escorted to the JLG by an RPT.
	The RIC recognized the downloading slings were slack and bundled on the ground near the base of the VCT.
1:33 p.m.	The RIC observed the top of the canister was about 4 feet from the top of the transfer cask and not lowered into the vault.
	The RIC directed the VCT operator to lift the canister.
1:41 p.m.	The canister load was fully supported by the VCT and downloading slings.
1:50 p.m.	An alternate CLS arrived and began to direct operations for downloading to the VCT operator.
	The alternate CLS and RIC noted that during downloading operations the canister experienced interference twice and had to be re-aligned.
2:22 p.m.	Downloading operations completed.
6:00 p.m.	Licensee places hold on all lifting operations.
August 6, 2018	At approximately 4 pm (CDT), the licensee informally contacted NRC Region IV to discuss the August 3, 2018, misalignment incident.
August 7, 2018	NRC Region IV and licensee management agreed that ISFSI operations would cease until the NRC performed an inspection and reviewed the licensee's corrective actions to resume work.
September 14, 2018	At 4 pm (ET) the licensee made a formal notification per 10 CFR 72.75(d)(1) to the NRC Headquarters Operations Center regarding the August 3, 2018, misalignment incident.

Violation of 10 CFR 72.172, Corrective Actions

Interviews with Williams Industrial Services Group and Sonic Systems (Holtec International subcontractors) employees indicated that of a loss-of-load condition or a canister misalignment issue was experienced during dry run evolutions and known to several dry cask storage workers. The Special Inspection team identified a prior canister misalignment issue that occurred on July 22, 2018, in which downloading operations lasted 90 minutes, instead of the expected 15 minutes for downloading canister 28. This incident was documented in a Production Traveler. A Production Traveler is a document that the licensee uses to track the performance of dry fuel storage operations by the

contractor, Holtec International. The Production Travelers were used to track how well the contractor was providing their contracted services to the licensee. The licensee did not enter this condition adverse to quality into its corrective action program.

Licensee oversight generally waited for Holtec staff to initiate a field condition report (FCR) before writing a corresponding condition report. In the Production Traveler for canister 28, the 90 minute delay was related to adjustments that were needed for the VCT towers as canister weight started to lower prematurely before the downloading was complete. This type of misalignment also occurred during the August 3, 2018, incident. On July 22, 2018, the downloading crew for canister 28, noted the reduction in the canister weight and corrected the alignment error. The canister was never unsupported by the slings. No condition report or FCR was generated by either the licensee or contractor.

Through interviews with licensee and contractor staff, the NRC determined that between January 30 and August 3, 2018, the downloading activity often involved contact between the canister and other vault components during downloading. The licensee and its contractor did not enter the misalignment and contact events into the corrective action program. Consequently, actions to assess and disposition the exterior conditions of the downloaded canisters and other components within the vault, such as the divider shell assembly, were not performed. The licensee is responsible to ensure the important to safety components continue to meet their original design criteria and address any aging management concerns the changes could impact. Any deviations, such as scratches or removal of coatings are required to be evaluated to ensure the deviations are not detrimental to the system.

Interviews with individuals involved in dry cask loading operations in August 2018, revealed that the difficulty in aligning the canister was not shared with others, nor was it incorporated into procedures or formal training programs. The VCT operator and the rigger/spotter in charge of downloading operations during the August 3, 2018, incident indicated that they did not know until afterwards that the condition they experienced was something that should have been anticipated.

10 CFR 72.172 requires, in part, that, licensees establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, and deviations are promptly identified and corrected. Contrary to the above, the licensee failed to establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, and deviations were promptly identified and corrected. Specifically:

1. On July 22, 2018, the crew experienced difficulty in aligning canister 28 for downloading into the ISFSI vault. However, the licensee failed to enter this deviation in downloading conditions into its corrective action program to determine the cause of the misalignment problem and develop corrective actions to preclude reoccurrence.

2. From January 30 to August 3, 2018, during canister downloading, contact between the canister and the vault components frequently occurred. The licensee failed to enter instances of contact into its corrective action program and perform an assessment to disposition the exterior conditions of the downloaded canisters and vault components.

The team determined that this violation was more than minor because the failure to implement corrective actions contributed to the misalignment incident of August 3, 2018. Additionally, the failure to evaluate and disposition wear marks on a canister, if left uncorrected, could impact the adequacy of the aging management program. The Special Inspection team assessed and dispositioned this violation in accordance with Section 2.2.2 of the NRC Enforcement Policy. The team characterized the violation as a Severity Level IV violation. The NRC determined the issuance of a Notice is appropriate because the actions to restore compliance have not been fully developed and implemented, and the actions must be effective prior to beginning fuel handling activities. (VIO 07200041/2018-001-01, Failure to identify and correct conditions adverse to quality)

Apparent Violation of Technical Specification 5.2.c.3, Redundant Lifting Equipment

On August 3, 2018, the licensee performed operations involving movement of a loaded spent fuel storage canister into its ISFSI vault. As the loaded spent fuel canister was being lowered into the vault, licensee and contractor personnel failed to notice that the canister was misaligned and the weight of the canister was not being supported by the redundant important to safety slings (See Sections 2.1 and 2.2).

10 CFR 72.212(b)(3) requires, in part, that each cask used by the general licensee conforms to the terms, conditions, and specifications of a Certificate of Compliance listed in 10 CFR 72.214. 10 CFR 72.214 includes a list of all the approved spent fuel storage casks that can be utilized under the conditions specified in a specific Certificate of Compliance, including Amendment 2 of Certificate of Compliance 072-01040. Certificate of Compliance 072-01040, Amendment 2, Condition 4, "HEAVY LOADS REQUIREMENTS," requires that lifting operations outside of structures governed by 10 CFR Part 50 must be in accordance with Technical Specifications, Appendix A, Section 5.2.

Technical Specification, Appendix A, Section 5.2.c.3 requires that the transfer cask, when loaded with spent fuel, may be lifted and carried at any height during multi-purpose canister transfer operations provided the lifting equipment is designed with redundant drop protection features which prevent uncontrolled lowering of the load.

Contrary to the above, on August 3, 2018, the licensee failed to ensure that redundant drop protection features were available to prevent uncontrolled lowering of the load. Specifically, the licensee inadvertently disabled the redundant important to safety downloading slings while lowering canister 29 into the storage vault. During the approximately 45 minute time-frame, the canister rested on a shield ring unsupported by the redundant downloading slings at approximately 17-18 feet above the fully seated position. This failure to maintain redundant drop protection placed canister 29 in an unanalyzed condition because the postulated drop of a loaded spent fuel canister is not analyzed in the FSAR.

The licensee's failure to ensure the system's designed redundant drop protection features were available to prevent uncontrolled lowering of the loaded canister was identified as an apparent violation of Technical Specification 5.2.c.3. (AV 07200041/2018-001-02, Failure to ensure redundant drop protection features are available)

Conclusions

The licensee failed to adequately implement the corrective action program for ISFSI operations. This failure resulted in missed opportunities to resolve misalignment errors during canister downloading operations between January 30 and August 3, 2018, and a violation of 10 CFR 72.172.

On August 3, 2018, the licensee failed to recognize that a misalignment of a canister during downloading operations caused redundant drop protection (slings) to be disabled and an apparent violation of Technical Specification 5.2.c.3.

3.1.2 Charter Item 1

Inspection Scope

"Identify and review all pertinent records, documents, and procedures related to the licensee's downloading operations at the ISFSI pad including but not limited to: worker training and qualifications; rigging equipment qualification, testing, and preventative maintenance; and lifting equipment qualification, testing, and preventative maintenance. Evaluate the adequacy of the above noted procedures, worker training, and equipment testing and preparation."

The Special Inspection team reviewed licensee rigging procedures and NUREG-0612 "Control of Heavy Loads at Nuclear Power Plants," training modules. The team reviewed the qualifications for the dry cask storage workers including the records for the workers involved in the August 3, 2018, misalignment incident. The team reviewed the inspection and maintenance records for special lifting devices used during dry fuel storage operations and the qualification records for rigging equipment. The team reviewed procedures used during canister downloading operations.

Observations and Findings

The equipment used for dry cask storage operations met applicable inspection requirements specified in the Holtec HI-STORM UMAX FSAR. The special lifting devices used to transport the transfer cask and to perform downloading operations were designed and tested according to American National Standards Institute (ANSI) N14.6, "American National Standard for Radioactive Materials – Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds or More." The slings used during downloading had a sufficient load rating for the maximum credible load imposed by the canister. The slings were tested according to the safety requirements of American Society of Mechanical Engineers (ASME) B30.9, "Slings." The purchase specifications, qualifications, and maintenance records for the VCT, downloading slings, canister lift cleats, lift lugs, and lift links were satisfactory.

Violation of 10 CFR 72.192, Training and Qualifications

The NRC team reviewed the qualifications of workers involved in the August 3, 2018, incident. Interviews with the individuals primarily responsible for verifying that the canister was properly downloaded into the ISFSI vault showed that the licensee's training program was inadequate for the positions that are designated as rigger/spotter and VCT operator. The VCT operator training program qualifications did not establish adequate required proficiency training exercises for downloading operations. The VCT operator on August 3, 2018, had never been tested on or exercised with the canister simulator during a pre-operational testing, "dry run" downloading operation. The August 3, 2018, misalignment incident was the first time the VCT operator had actually completed downloading operations as the VCT operator.

Neither the rigger/spotter nor VCT operator was properly trained in determining a loss-of-load condition during downloading operations. The VCT operator stated that he was knowledgeable of the VCT human-machine interface (HMI) screens and that indications provided a digital reading that could allow the operator to determine if the canister was not supported by the slings. However, the VCT operator stated that he did not use the VCT HMI screen to monitor the load of the canister at any time during the August 3, 2018, downloading operations. The VCT operator indicated that he only utilized the HMI screen to determine how evenly the VCT lift beam was descending.

From his position on the VCT, the VCT operator could not see the canister downloader slings. The only indication of a loss-of-load would come from monitoring the VCT hydraulic beam pressure digital reading on the VCT HMI screen, which was not performed. Since the operator had not performed any proficiency training with the VCT during a dry run downloading operation, the individual was inexperienced with the use of the HMI screen to monitor load loss.

The licensee's training program did not provide a formal process to be qualified for the rigger/spotter position during downloading operations. The rigger/spotter stated that he was not trained on and did not know his roles and responsibilities during the downloading evolution. The August 3, 2018, misalignment incident was the first time the rigger/spotter had attempted to perform downloading operations as the rigger/spotter in the JLG.

The NRC team's interview with the foreman indicated that the rigger/spotter was selected primarily because of his low accumulated radiation dose. From interviews with licensee and contractor staff, an experienced RIC was usually the individual placed in the JLG and acted as the rigger/spotter for the downloading operations. On August 3, 2018, it was the RIC who eventually entered the JLG after the misalignment and directed the VCT operator to lift the canister with the VCT lift beam to regain the load on the slings. The RIC had immediately recognized that the canister was not downloaded into the ISFSI vault when he arrived and saw the condition of the downloader slings.

The failure to ensure operators are adequately qualified and proficiency tested when operating important to safety equipment and directing critical lift operations is a performance deficiency. The licensee's training program that allowed the rigger/spotter and VCT operator to be placed into a situation where their lack of training rendered them

incapable of meeting the requirements for the job represented a failure of the licensee's training program.

10 CFR 72.192 requires, in part, that the licensee establish a program for training, proficiency testing, and certification of ISFSI personnel. Contrary to the above, from January 30 to August 3, 2018, the licensee failed to establish an adequate program for training, proficiency testing, and certification of all ISFSI personnel. Specifically:

1. The training program failed to adequately train and certify the rigger/spotter position involved in the important to safety downloading operation.

2. The training program for the vertical cask transporter operator position failed to have adequate proficiency testing on the controls related to the load indicating device and downloading operations.

The team determined that this violation was more than minor because the licensee's failure to establish an adequate training program contributed to the misalignment incident on August 3, 2018. The team assessed and dispositioned this violation in accordance with Section 2.2.2 of the NRC Enforcement Policy. The team characterized the violation as a Severity Level IV violation. The NRC determined the issuance of a Notice is appropriate because the actions to restore compliance have not been fully developed and implemented, and the actions must be effective prior to beginning fuel handling activities. (VIO 07200041/2018-001-03, Failure to establish adequate training program)

The team identified that the simulator canister used for training and dry run demonstrations had a specified outer diameter that was less than that of the actual spent fuel storage canisters being downloaded into the vault. The simulator canister provided approximately 0.75 inch more clearance than the actual canisters loaded with spent fuel. This difference may be acceptable for the dry run activities; however, the difference was not noted in any of the licensee's training materials for rigger/spotters or the VCT operators. This represents a situation of negative training that may have contributed to the August 3, 2018, misalignment incident.

Conclusions

The important to safety lifting equipment and special lifting devices being used for dry cask storage operations met applicable regulatory requirements.

Personnel lacked the proper training, proficiency testing, and certifications to operate important to safety equipment. This was identified as a violation of 10 CFR 72.192 requirements.

3.1.3 Charter Items 2 and 4

Inspection Scope

"Evaluate the adequacy of the loading procedure(s) with respect to verification of the movement, centering, lowering, and positioning the canister within the ISFSI vault and procedure adherence. Interviews with personnel involved in the ISFSI loading operations should be conducted to evaluate licensee and contractor communications

between crane/VCT operators, rigging and spotting staff, cask loading supervisors, radiation protection staff, and licensee oversight personnel. Evaluate the adequacy of pre-job briefings that may have taken place prior to fuel loading operations."

"Based on the review of the procedures and interviews of personnel involved with loading operations, evaluate the adequacy of procedure adherence."

The Special Inspection team reviewed Holtec Procedure HPP-2464-400, "Multi-Purpose Canister Transfer Operations at SONGS," Revision 15; Holtec Procedure HPP-2464-600, "Responding to Abnormal Conditions," Revision 6; SONGS Procedure SO123-0-A7, "Notification and Reporting of Significant Events," Revision 46; and other applicable procedures related to the August 3, 2018, misalignment incident. The team reviewed the pre-job briefing in use by the CLSs. The team discussed ISFSI communications during downloading operations with the licensee and contractor staff.

Observations and Findings

Violation of 10 CFR 72.150, Procedures

The VCT is not equipped with a load-cell to provide the weight of the canister. A hydraulic pressure indication for the lift beam could be used to provide a qualitative means for determining if the slings are not supporting the canister's weight. This pressure indication is displayed on the VCT HMI control panel.

The team identified examples of a violation of 10 CFR 72.150, "Instructions, Procedures, and Drawings." Holtec Procedure HPP-2464-400 provided direction and guidance for verifying canister movement, canister centering operations, and for lowering the canister into the vault. Many steps in the procedure provided direction without quantitative or qualitative means to verify that important to safety steps had been achieved, including detection of a loss-of-load condition and final verification that the canister had been fully downloaded into the vault. For example, step 7.6.12 instructed the VCT operator to continue to raise the VCT lift beam slowly until the full weight of the canister is on the VCT.

However, there is no quantitative direct measurement for the VCT operator to determine when the "full weight" of the canister is indicated on the VCT HMI control panel. The procedure contained a note that the load on the VCT HMI screen may be used to determine if downloader slings had become slack. However the procedure did not direct the VCT operator to monitor the HMI control panel nor provide a qualitative or quantitative value that would notify the VCT operator that the canister had become misaligned and that the VCT was no longer bearing the load of the canister.

Holtec Procedure HPP-2464-400, step 7.6.23, states, if at any time the download slings become slack prior to the canister being in the full down position then immediately stop lowering the canister. During downloading operations there was only one position who could determine whether or not the slings had gone slack. That position was the rigger/spotter who is responsible to monitor the movement of the canister during downloading operations from the elevated JLG basket. The rigger/spotter was observing the slings during the August 3, 2018, downloading evolution. However, the rigger/spotter was only observing the slings for "slack" at the top of the transfer cask.

The procedure did not provide adequate direction to the rigger/spotter to observe the slings near the base of the VCT, which had become slack and were bundling up on the ground. Additionally, the procedure did not provide direction for the rigger/spotter to monitor the height of the canister in relation to the height of the lift beam.

10 CFR 72.150, requires, in part, that the licensee prescribe activities affecting quality by documented instructions or procedures of a type appropriate to the circumstances and must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to the above, from January 30 to August 3, 2018, the licensee failed to prescribe activities affecting quality by documented instructions or procedures of a type appropriate to the circumstances and include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically:

1. Procedure HPP-2464-400, "Multi-Purpose Canister Transfer at SONGS," Revision 15, step 7.6.23, failed to provide qualitative and quantitative directions for the VCT operator to monitor control panel indications that would identify a canister had become misaligned during downloading operation.

2. Procedure HPP-2464-400, "Multi-Purpose Canister Transfer at SONGS," Revision 15, step 7.6.23, failed to include adequate instructions for the rigger/spotter to monitor the downloading slings for a slack condition.

The team determined that this violation was more than minor because the licensee's failure to prescribe adequate procedures contributed to the August 3, 2018, misalignment incident. The team assessed and dispositioned this violation in accordance with Section 2.2.2 of the NRC Enforcement Policy. The team characterized the violation as a Severity Level IV violation. The NRC determined the issuance of a Notice is appropriate because the actions to restore compliance have not been fully developed and implemented, and the actions must be effective prior to beginning fuel handling activities. (VIO 07200041/2018-001-04, Failure to provide adequate instructions of procedures)

Communications

During downloading on August 3, 2018, radiation protection staff directed the CLS and licensee oversight personnel to relocate to a low dose area off of the ISFSI pad. The low dose waiting area was located approximately 150 feet away from the ISFSI operations on the heavy haul path that is approximately 8 feet lower in elevation. From the low dose area, neither the contractor nor licensee oversight staff could observe the downloading activities. The NRC determined that the removal of oversight staff in an effort to minimize radiation dose without other compensatory measures resulted in inadequate supervisory oversight of important to safety lifting operations.

The communication protocols used by the CLS, VCT operator, and the rigger/spotter was reviewed by the team. The CLS was in direct communications via radio and headsets with the VCT operator and rigger/spotter. The radios provided adequate communication in the noisy environment of the VCT. Communication between the CLS, VCT operator, and the rigger/spotter during the downloading operation was informal. The CLS did not request a reading of the HMI control panel to determine hydraulic

pressure and repeat-backs of the location of canister during the downloading process were misunderstood.

Radiation Protection staff were not provided headsets for communications. Radiation Protection staff were able to communicate concerns directly with the CLS, who could communicate radiological concerns to workers, if necessary.

The licensee's oversight personnel were not provided headsets during downloading operations. The licensee did not provide direct oversight of downloading operations. During the August 3, 2018, misalignment incident, neither licensee oversight nor contractor supervision were in a position to directly monitor the downloading operations or the actual condition of the canister.

Conclusions

Dry cask storage procedures did not provide adequate directions for how to determine the downloader slings were slack. The downloading procedure did not include qualitative or quantitative means for determining when a canister had become misaligned. These procedure inadequacies were identified as examples of a violation of 10 CFR 72.150 requirements.

No licensee or contractor oversight personnel were in direct visual observations of the important to safety activities during downloading operations on August 3, 2018. All personnel except the rigger/spotter and VCT operator left the ISFSI pad during downloading operations. Licensee oversight was not a part of the communications between the CLS, the rigger/spotter, and VCT operator during canister downloading operations. Without adequate communications and visual observation, the licensee and the contractor were unable to verify that important to safety dry cask storage activities were adequately performed.

3.1.4 Charter Items 3 and 8

Inspection Scope

"Review and evaluate the licensee's immediate corrective actions taken after the incident for adequacy and notifications to the NRC and safety assessments performed immediately following the incident. Review the licensee's inspection documentation and/or analysis to determine whether the vault's divider shell experienced any damage that would inhibit the component from performing its designed safety function.

"Investigate the licensee's procedures for reportability to the NRC and determine if the licensee made the correct decision regarding notifications made to the NRC for this incident."

The Special Inspection team reviewed the licensee's initial assessment of the incident through presentations and discussions provided by the licensee. The team reviewed all condition reports and entries made into the licensee's and dry cask storage vendor's corrective action programs regarding the canister misalignment incident, and the condition of the divider shell and canister 29. The team reviewed the notification requirements of 10 CFR 72.75 against the conditions experienced during the August 3, 2018, misalignment incident and reviewed licensee Procedure SO123-0-A7, "Notification and Reporting of Significant Events," Revision 46.

Observations and Findings

Divider Shell Assessment

The licensee immediately stopped all dry cask storage operations following the misalignment incident of August 3, 2018, pending a root cause evaluation to be performed by their dry cask storage vendor, Holtec International. The licensee initiated an apparent cause evaluation to determine if problems in its organization may have contributed to the misalignment incident.

The misalignment incident was entered into the corrective action program by Holtec as FCR 2464-1189. The Holtec FCR was initiated to investigate the August 3, 2018, incident as a human performance issue. This FCR prompted the licensee to initiate Action Request 0818-76588. This action request included an assessment of the condition of the divider shell and canister.

Action Request 0818-76588 described the removal of paint/coating from the divider shell. The action request concluded that the incidental transfer of divider shell coating to the canister shell did not affect the canister's design functions of confinement, shielding, structural, thermal, and criticality. Future actions to address coating presence will be included in the licensee's ISFSI aging management plan. The NRC team reviewed the licensee's assessment for the divider shell and concluded the component can perform its safety functions. Additionally, the licensee's plan to address future inspection of the divider shells in its aging management program was acceptable.

Apparent Violation 10 CFR 72.75, Reporting

The team identified an apparent violation of 10 CFR 72.75 for late notification of 24-hour reporting requirements involving important to safety equipment that was disabled or failed to function as designed when the equipment is required by license condition and no redundant equipment is available and operable to perform the required safety function.

On August 3, 2018, during downloading operations associated with canister 29 the licensee disabled the important to safety slings while downloading a canister (See Section 2.1 and 2.2). The canister was placed in a potential load drop condition for approximately 45 minutes before the licensee was able to restore the load onto the important to safety slings, thereby restoring the redundant drop protection features.

After the incident, the licensee provided a courtesy notification to the NRC Region IV office at approximately 4 p.m. CDT on the afternoon of August 6, 2018.
10 CFR 72.75(d)(1), would have allowed for notification to be made to the NRC Operations Center as late as 0800 EDT on Monday, August 6, 2018. The courtesy notification made to the regional office did not satisfy the reporting requirements of 10 CFR 72.75. During the August 6, 2018, call, the NRC informed the licensee that a formal report to the NRC was likely required.

Notification of the NRC Operations Center did not occur until the licensee was prompted by the NRC team on September 14, 2018. The condition was reported to the NRC Headquarters Operations Center on September 14, 2018, at 1600 EDT (Event Notification 53605).

10 CFR 72.75(d)(1) requires, in part, that each licensee shall notify the NRC within 24 hours after the discovery of any of the following events involving spent fuel in which important to safety equipment is disabled or fails to function as designed when: (i) the equipment is required by regulation, license condition, or certification of compliance to be available and operable to mitigate the consequences of an accident; and (ii) no redundant equipment was available and operable to perform the required safety function.

Contrary to the above, from August 6 to September 14, 2018, the licensee failed to notify the NRC after discovery of important to safety equipment being disabled and failing to function as designed when required by the Certificate of Compliance to provide redundant drop protection features to prevent and mitigate the consequences of a drop accident and no redundant equipment was available and operable to perform the required safety function.

The licensee's failure to make the required 24-hour notification to the NRC within the required timeframe was identified as an apparent violation of 10 CFR 72.75(d). (AV 07200041/2018-001-05, Failure to make 24-hour notification)

Conclusions

The licensee concluded that the incidental removal of divider shell coating during downloading operations did not affect the design functions for shielding, structural, and thermal safety functions. The NRC has reviewed the licensee's assessment for the divider shell and has concluded the component can perform its safety functions. Additionally, the licensee's plan to address future inspection of the divider shells in their aging management program is acceptable.

The licensee failed to make the required formal 24-hour NRC notification of the August 3, 2018, event where important to safety equipment was disabled when the equipment was required to mitigate the consequences of an accident and no redundant equipment was available to perform the safety function. This failure was identified as an apparent violation of 10 CFR 72.75(d) requirements.

3.1.5 Charter Item 6

Inspection Scope

*"Review the licensee's root cause investigation results, to determine whether the review thoroughly identified all contributing factors and that final corrective actions will be adequate to prevent reoccurrence. Evaluate whether prior operational experience relating to complications or issues associated with canister downloading operations was identified and considered as part of the licensee's root cause investigation and corrective action development***."**

The Special Inspection team reviewed the causal evaluations that were performed for the August 3, 2018, misalignment incident. Specifically, the team reviewed Holtec International's Root Cause Analysis Report for the canister downloading incident and the licensee's Apparent Cause Evaluation to assess oversight effectiveness during the August 3, 2018, download of canister 29.

Observations and Findings:

Holtec International's Root Cause Evaluation

The licensee directed Holtec to perform a causal evaluation as a follow-up item in condition report action request 0818-76588 that the licensee initiated following the August 3, 2018, misalignment incident. The Holtec causal evaluation identified one root cause and five contributing causes:

- Root Cause: Holtec Management failed to implement appropriate program improvements or the necessary level of oversight commensurate with the complexity and risks associated with downloading operations.

- Contributing Cause 1: Inadequate content in procedures for recognizing special conditions.

- Contributing Cause 2: Design review process did not ensure that unintended consequences of design features were captured.

- Contributing Cause 3: Communication protocols with the chain of command established during canister movement were not well defined.

- Contributing Cause 4: Holtec had not established a continuous learning environment which promoted the use of internal and external operating experience.

- Contributing Cause 5: Holtec Training Program did not fully establish qualification or proficiency requirements for workers performing downloading operations.

Southern California Edison Company's Apparent Cause Evaluation

The licensee initiated an apparent cause evaluation (ACE) to determine how its organization may have contributed to allowing the August 3, 2018, loss-of-load incident to occur. The licensee's apparent causes were related to deficiencies in procedures, training, and in oversight of contractor activities.

- Apparent Cause 1: Management failed to establish a process to ensure that site dry cask storage procedures were technically accurate.

- Apparent Cause 2: Management failed to establish licensee and contractor training to support procedure implementation.

- Apparent Cause 3: Management failed to sufficiently detail contractor Oversight Specialist guidance.

- Contributing Cause 1: ISFSI project management was not routinely observing dry cask storage operations.

- Contributing Cause 2: ISFSI project management was not consistently initiating condition reports for dry cask storage operations that deviated from normal.

Both the licensee and Holtec causal evaluations reviewed many of the items identified by the NRC team. Those items being: procedure adequacy; training adequacy; adequacy of the corrective action program; oversight adequacy; and the inconsistent use of operational experience during routine dry cask storage operations.

The causal evaluations assessed the severity of the canister misalignment incident. The licensee determined that in the event of a canister drop accident from 25 feet into the vault, there was no risk of radioactive exposure to the public. A publicly available version of the licensee's drop analysis summary is available in ADAMS (ADAMS Accession No. ML18330A003). The NRC will continue to review the adequacy of the causal analyses, corrective actions, and potential consequences during a follow-up inspection which is planned to be performed before the resumption of fuel handling activities.

Conclusions

The apparent and root causes for the August 3, 2018, canister misalignment incident involved inadequate training, inadequate procedures, poor utilization of the corrective action program, and insufficient oversight.

3.1.6 Charter Item 7

Inspection Scope

"Review the licensee's planned actions that will address the point loading condition that was experienced by the affected canister. If applicable, review the licensee's analysis that demonstrated the canister will continue to perform as designed for continued storage OR review licensee's inspection plan to safely remove or lift the canister from the vault to support inspection of the bottom of the canister to demonstrate the canister did not receive any damage that would inhibit the component from continuing to perform as designed."

Observations and Findings

The licensee performed an evaluation to demonstrate the canister continues to meet the design and performance requirements described in the FSAR. The Special Inspection team reviewed the licensee's initial assessment of the canister 29 condition after the misalignment incident.

The preliminary evaluation provided by the licensee stated that both the canister and vault were not expected to have any physical damage that would exceed the pre-defined limits used during receipt inspection and manufacturer acceptance testing. The NRC requested additional analysis to ensure that the canister meets design requirements. Additionally, the licensee is evaluating whether the canister will require increased surveillance frequency for the aging management program. The licensee had not

completed the evaluation for NRC review prior to the NRC's inspection exit meeting. This charter item will be reviewed during a future NRC inspection.

Conclusions

The licensee has chosen to provide an analysis to demonstrate that the potential damage to canister 29 during the downloading would meet established acceptance criteria. The NRC determined that additional analysis was required for the NRC to ensure that the canister meets design requirements. This charter item will be reviewed during a future NRC inspection.

3.1.7 Charter Item 9

Inspection Scope

"As directed by regional management, observe resumption of fuel loading operations to verify that corrective actions were effective in addressing deficiencies that contributed to the incident. This should include evaluation of procedure and/or equipment enhancements; review or observation of training and briefings provided to riggers, crane operators, spotters and observers, supervisors and other personnel involved in fuel loading operations."

Observations and Findings

The licensee suspended all fuel handling activities following the August 3, 2018, misalignment incident. The NRC will review the licensee's revised procedures, training plans, equipment modifications, and performance testing (dry runs) of its dry cask storage operations in a future inspection to determine the effectiveness of corrective actions for the incident.

Conclusions

All associated corrective actions for the August 3, 2018, incident had not been completely finalized or implemented by the licensee. The NRC will review the licensee's revised procedures, training plans, equipment modifications, and performance testing (dry runs) of its dry cask storage operations during a future inspection to determine the effectiveness of corrective actions for the incident.

3.1.8 Charter Item 10

Inspection Scope:

"Determine if the inspection should be elevated to an Augmented Inspection Team (AIT) inspection and promptly notify regional management of any recommendation to escalate the special inspection to an AIT."

As a daily action item, the NRC Special Inspection Team reviewed NRC Inspection Manual Chapter 0309, "Reactive Inspection Decision Basis for Reactors," Enclosure 2, to determine whether any of the facts or details uncovered during the course of the inspection met the deterministic criteria that would require the Special Inspection at SONGS to be elevated to an AIT.

Observations and Findings

The deterministic criteria for an event to be elevated to an AIT effort are delineated in Manual Chapter 0309. The Special Inspection Team did not identify any indication that the August 3, 2018, misalignment incident at SONGS led to a radiological release. Additionally, the incident did not involve the failure of the spent fuel canister, the release of radiological contamination, or external radiation levels that exceeded 10 rads/hr. Consequently, there was no need to elevate the inspection effort to an AIT. The team's daily re-evaluation was communicated to Regional management during the week of onsite inspection effort.

Conclusions

The NRC team did not identify any information that would have required the Special Inspection to be elevated to an AIT effort.

4 Exit Meeting Summary

On September 14, 2018, following the onsite portion of the inspection, the inspectors provided a debrief of the preliminary results to Mr. Tom Palmisano, former Vice President and Chief Nuclear Officer and other members of the licensee staff. The licensee acknowledged the issues presented by the NRC inspection team.

On November 1, 2018, the inspectors presented the final inspection results to Mr. Tom Palmisano, former Vice President and Chief Nuclear Officer and other members of the licensee staff. The licensee acknowledged the issues presented.

On November 8, 2018, the NRC performed a public webinar meeting to discuss the inspection team's preliminary results.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

A. Bates, Regulatory and Oversight Manager
M. Morgan, Regulatory and Oversight
L. Bosch, Plant Manager
G. Carter, Westinghouse Project Manager
P. Chaudnary, Vice President of Operations, Holtec
J. Manso, ISFSI Sr. Project Manager
T. Palmisano, former Vice President Decommissioning and Chief Nuclear Officer
J. Pugh, Project Engineer
K. Rod, General Manager Decommissioning Oversight
J. Smith, Project Manager, Holtec
M. Soler, Vice President Quality, Holtec

INSPECTION PROCEDURES USED

IP 93812 Special Inspection

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

072-00041/2018-001-01	VIO	Failure to identify and correct conditions adverse to quality. (10 CFR 72.172)
072-00041/2018-001-02	AV	Failure to ensure redundant drop protection features were available (10 CFR 72.212)
072-00041/2018-001-03	VIO	Failure to establish adequate training program (10 CFR 72.192)
072-00041/2018-001-04	VIO	Failure to provide adequate instructions or procedures. (10 CFR 72.150)
072-00041/2018-001-05	AV	Failure to make 24-hour notification (10 CFR 72.75)

Discussed
None

Closed
None

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ADR	Alternative Dispute Resolution
AIT	Augmented Inspection Team
ANSI	American National Standards Institute
AV	Apparent Violation
ASME	American Society of Mechanical Engineers
CFR	*Code of Federal Regulations*
CLS	Cask Loading Supervisor
FCR	Field Condition Report
FSAR	Final Safety Analysis Report
HI-STORM UMAX	Holtec International Storage Module Underground Maximum Capacity
HMI	Human-Machine Interface
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
JLG	Engine or Motor Powered Boom Lifting Device
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
MPC	multipurpose canister
PEC	Pre-decisional Enforcement Conference
RIC	Rigger-in-charge
RPT	Radiation Protection Technician
SL	Severity Level
SONGS	San Onofre Nuclear Generating Station
TS	Technical Specification
VCT	Vertical Cask Transporter
VIO	Violation
VVM	Vertical Ventilated Module or vault

Special Inspection Charter dated August 17, 2018 (ML18229A203)

Enclosure 3

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

August 17, 2018

MEMORANDUM TO: Eric J. Simpson, CHP, Health Physicist
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

W. Chris Smith, Reactor Inspector
Engineering Branch 1
Division of Reactor Safety

Marlone X. Davis, Transportation & Storage Safety Inspector
Inspections & Operations Branch
Division of Spent Fuel Management

THROUGH: Janine F. Katanic, PhD, CHP, Chief /RA/ LLH for
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

FROM: Troy W. Pruett, Director /RA/
Division of Nuclear Materials Safety

SUBJECT: INSPECTION CHARTER TO EVALUATE THE NEAR-MISS LOAD DROP EVENT AT SAN ONOFRE NUCLEAR GENERATING STATION

A special inspection has been chartered to review the licensee's follow-up investigation, causal evaluation, and planned corrective actions regarding the near-miss drop event involving a loaded spent fuel storage canister at the San Onofre Nuclear Generating Station (SONGS) Independent Spent Fuel Storage Installation (ISFSI) on Friday, August 3, 2018. (License Nos. NPF-10 and NPF-15, Docket Nos. 50-361, 50-362 and 72-41).

CONTACT: Janine F. Katanic, PhD, CHP, FCDB/DNMS
(817) 200-1151

BACKGROUND AND BASIS

On Friday, August 3, 2018, at approximately 1:30 pm (PST), SONGS was engaged in operations involving movement of a loaded spent fuel storage canister into its underground ISFSI storage vault (HI-STORM UMAX storage system). As the loaded spent fuel canister was being lowered into the storage vault using lifting and rigging equipment, the licensee's personnel failed to notice that the canister was misaligned and was not being properly lowered. The licensee continued to lower the rigging and lifting equipment until it believed that the canister had been fully lowered to the bottom of the storage vault. However, a radiation protection technician identified elevated radiation readings that were not consistent with a fully lowered canister. The licensee then identified that the loaded spent fuel canister was hung up on a metal flange near the top of the storage vault, preventing it from being lowered, and that the rigging and lifting equipment was slack and no longer bearing the load of the canister.

In this circumstance, with the important to safety (ITS) rigging and lifting equipment completely down in the lowest position, the ITS equipment was disabled from performing its designed safety function of holding and controlling the loaded canister from a potential canister drop condition. The licensee reported that the canister was resting on a metal flange within the storage vault. It was estimated that the canister could have experienced an approximately 17-18 foot drop into the storage vault if the canister had slipped off the metal flange or if the metal flange failed. This load drop accident is not a condition analyzed in the dry fuel storage system's Final Safety Analysis Report (FSAR).

In response to the discovery that the canister was not fully lowered, the licensee took immediate actions to restore control of the load to the rigging and lifting devices. The estimated time the canister was in an unanalyzed credible drop condition was approximately 45 minutes to 1 hour in duration. The licensee regained control of the load, repositioned the canister, and lowered the canister into the storage vault. The licensee halted all dry fuel storage movement operations in order to fully investigate the incident and develop corrective actions to prevent a recurrence. In addition, the licensee has shared the operational experience with another site with a similar dry fuel storage system.

Region IV became aware of the SONGS "near-miss" incident on Monday, August 6, 2018, when the licensee provided a courtesy notification and described it as a "near-miss" or "near-hit" event. The reporting requirements of the incident are still being evaluated by the Region and discussed with the licensee.

On August 7 and 16, 2018, Region IV and NMSS representatives participated in conference calls with licensee representatives in order to gather additional facts regarding the circumstances of the incident and the licensee's investigation. Region IV is evaluating the information provided by the licensee and is coordinating with the Division of Spent Fuel Management, NMSS.

The NRC is chartering this special inspection pursuant to Management Directive 8.3, "NRC Incident Investigation Program," and NRC Inspection Manual Chapter 0309, "Reactive Inspection Decision Basis for Reactors."

The purpose of the inspection is to investigate the occurrence; interview personnel; observe equipment; and review relevant documentation, including the results of the licensee's investigation and causal analysis, and development and implementation of actions to prevent

recurrence. The licensee has committed to not resume fuel loading operations until after this special inspection and associated reviews are complete. Once the licensee has confirmed its plans to resume fuel loading operations, inspectors will also observe the loading operations to ensure that the corrective actions are adequate. These observations may be conducted as part of this special inspection or as an independent inspection activity, as directed by regional management.

SCOPE

The inspection should seek to address the following items at a minimum:

1. Identify and review all pertinent records, documents, and procedures related to the licensee's downloading operations at the ISFSI pad including but not limited to: worker training and qualifications; rigging equipment qualification, testing, and preventative maintenance; and lifting equipment qualification, testing, and preventative maintenance. Evaluate the adequacy of the above noted procedures, worker training and equipment testing and preparation.

2. Evaluate the adequacy of the loading procedure(s) with respect to verification of MPC movement, centering the MPC over the ISFSI vault, lowering the MPC, and positioning the MPC within the ISFSI vault. Interviews with personnel involved in the ISFSI loading operations should be conducted to evaluate licensee and contractor communications between crane/VCT operators, rigging and spotting staff, cask loading supervisors, radiation protection staff, and licensee oversight personnel. Evaluate the adequacy of pre-job briefings that may have taken place prior to fuel loading operations.

3. Review and evaluate the licensee's immediate corrective actions taken after the event for adequacy of notifications to the licensee and safety assessments performed immediately following the event. Review the licensee's inspection documentation and/or analysis to determine whether the vault's divider shell experienced any damage that would inhibit the component from performing its designed safety function.

4. Based on the review of procedures and interviews of personnel involved with loading operations, evaluate the adequacy of procedure adherence.

5. Interview personnel associated with the event to develop a timeline to ensure the licensee's investigation contained all necessary information to identify all contributing factors and develop adequate corrective actions.

6. Review the licensee's root cause investigation results, to determine whether the review thoroughly identified all contributing factors and that final corrective actions will be adequate to prevent reoccurrence. Evaluate whether prior operational experience relating to complications or issues associated with canister downloading operations was identified and considered as part of the licensee's root cause investigation and corrective action development.

7. Review the licensee's planned actions that will address the point loading condition that was experienced by the affected canister. If applicable, review the licensee's analysis that demonstrated the canister will continue to perform as designed for continued storage OR review licensee's inspection plan to safely remove or lift the canister from the vault to support inspection of the bottom of the canister to demonstrate the canister did not

receive any damage that would inhibit the component from continuing to perform as designed.

8. Investigate the licensee's procedures for reportability to the NRC and determine if the licensee made the correct decision regarding notifications made to the NRC for this event.

9. As directed by regional management, observe resumption of fuel loading operations to verify that corrective actions were effective in addressing deficiencies that contributed to the event. This should include evaluation of procedure and/or equipment enhancements; review or observation of training and briefings provided to riggers, crane operators, spotters and observers, supervisors and other personnel involved in fuel loading operations.

10. Determine if the inspection should be elevated to an AIT and promptly notify regional management of any recommendation to escalate the special inspection to an AIT.

GUIDANCE

The NRC is chartering this special inspection pursuant to Management Directive 8.3, "NRC Incident Investigation Program," and NRC Manual Chapter 0309, "Reactive Inspection Decision Basis for Reactors." The Manual Chapter and Management Directive identify Inspection Procedure 93812, "Special Inspection," for specific use in reviewing events. Planned Dates of Inspection are September 10-14, 2018.

This inspection should emphasize fact-finding in its review of the circumstances surrounding the near-miss canister drop event. Safety concerns identified that are not directly related to near-miss drop event should be reported to NRC management for appropriate action.

Daily briefings with NRC management should occur to discuss the team's progress and preliminary observations.

In accordance with Manual Chapter 0610, a report documenting the results of the inspection should be issued within 30-45 days of the completion of the inspection.

This Charter may be modified should NRC inspectors find significant new information that warrants review. Should you have any questions concerning this charter, please contact Janine F. Katanic at 817-200-1151.

INSPECTION CHARTER TO EVALUATE THE NEAR-MISS LOAD DROP EVENT AT SAN ONOFRE NUCLEAR GENERATING STATION – DATED AUGUST 17, 2018

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■SUNSI Review By: LLH	ADAMS: ■ Yes ☐ No	☐ Non-Publicly Available ■ Publicly Available	■Non-Sensitive ☐ Sensitive	Keyword: NRC-002

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