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WITNESS: John Geesman

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

PREPARED TESTIMONY OF JOHN GEESMAN
ON BEHALF OF THE ALLIANCE FOR NUCLEAR RESPONSIBILITY

("A4NR")

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I. INTRODUCTION: THREE DEFICIENCIES IN THE JOINT APPLICATION.

Q01: Please state your name and business address for the record.

A01: My name is John Geesman, and my business address is: Dickson Geesman LLP, P.O. Box 177, Bodega, CA 94922.

Q02: Are your professional qualifications included in your testimony?

A02: Yes, my professional qualifications are contained in the Appendix to my testimony.

Q03: Was your testimony prepared by you or under your direction?

A03: Yes, it was.

Q04: Insofar as your testimony contains material that is factual in nature, do you believe it to be correct?

A04: Yes, I do.

Q05: Insofar as your testimony contains matters of opinion or judgment, does it represent your best judgment?

A05: Yes, it does.

Q06: Does this written submittal complete your prepared testimony and professional qualifications?

A06: Yes, it does.

Q07: What is the purpose of your testimony?

A07: The purpose of my testimony is to provide evidence of certain deficiencies in the Joint Application of Southern California Edison Company ("SCE") and San Diego Gas & Electric Company ("SDG&E") for the 2021 Nuclear Decommissioning Cost Triennial Proceeding ("Joint Application") and to recommend remedies for those deficiencies in order to reduce foreseeable upward pressure on the future costs of decommissioning the three San Onofre Nuclear Generating Station ("SONGS") units.

Q08: What are the alleged deficiencies in the Joint Application on which your testimony focuses?

A08: I focus on three involving SONGS which, unless corrected, are likely to each have a significant adverse impact on the conduct and cost of decommissioning: (1) the unsupported attempt of the Joint Application to charge the ratepayer-funded trusts for the $45.9 million (2014 dollars) in increased decommissioning costs attributable to the delay caused by the August 3, 2018 cask loading incident, despite SCE's agreement to findings of culpability by the Nuclear Regulatory Commission ("NRC") and its admission of failures in its oversight of the work; (2) the Joint Application's continuing reliance on implausible assumptions for the removal of spent nuclear fuel ("SNF") from the SONGS site to size the Decommissioning Cost Estimate ("DCE") for Unit 1 and for Units 2&3; and (3) the Joint Application's deferral of removal of Units 2&3 subsurface structures until all SNF leaves the SONGS site, notwithstanding the requirement in Coastal Development Permit ("CDP") 9-19-0194, that SCE apply no later than June 1, 2028 for the removal, to the extent feasible, of all remaining onshore structures at SONGS that may be exposed in the future due to coastal processes or that otherwise would have coastal impacts if they were to remain.

II. DEFICIENCY: THE UNSUPPORTED ATTEMPT OF THE JOINT APPLICATION TO CHARGE THE RATEPAYER-FUNDED TRUSTS FOR THE $45.9 MILLION (2014 DOLLARS) IN INCREASED DECOMMISSIONING COSTS ATTRIBUTABLE TO THE DELAY CAUSED BY THE AUGUST 3, 2018 CASK LOADING INCIDENT.

Q09: Please describe the August 3, 2018 cask loading incident.

A09: According to the NRC's August 17, 2018 "Inspection Charter to Evaluate the Near-Miss Load Drop Event at San Onofre Nuclear Generating Station":

> 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.

… The licensee has committed to not resume fuel loading operations until after this special inspection and associated reviews are complete.[1]

Q10: What did the NRC determine?

A10: According to the Frequently Asked Questions and Answers link on the NRC's web page about the cask loading incident:

The NRC independently reviewed the licensee's evaluation analyzing the potential effects of a canister drop. The evaluation conservatively assumed the canister fell an uninterrupted 25 feet to the base of the UMAX vault. The actual height the canister could have dropped was about 18 feet. It was concluded that the canister would have remained intact as a result of the fall. However, the spent fuel would not have remained intact after such a drop. The licensee's analysis concluded that fuel damage would involve deformation and buckling of the lowest section of the spent fuel assemblies.

… Dry cask personnel lacked the proper training and certifications to operate the important to safety equipment. Dry cask storage procedures did not provide adequate directions for how to determine whether the spent fuel storage canister was being supported by the downloader slings. Procedures did not include qualitative or quantitative means to determine when the slings were no longer supporting the load. Finally, no licensee oversight staff

[1] NRC, Inspection Charter to Evaluate the Near-Miss Load Drop Event at San Onofre Nuclear Generating Station, August 17, 2018, pp. 2 – 3. Accessible at https://www.nrc.gov/reactors/operating/ops-experience/songs-spec-insp-activities-cask-loading-misalignment.html

were in direct visual observation of important to safety activities during downloading operations on August 3, 2018.

… The NRC determined and informed the licensee that they had failed to file a report in accordance with the regulations of 10 CFR 72.75(d)(1) during its exit meeting with the licensee on September 14, 2018. Later that day, the licensee made the required 10 CFR 72.75 report.

During the NRC Special Inspection, it was discovered that a similar, but very different, canister misalignment issue had occurred a couple of weeks prior to the August 3rd event. NRC learned of the event while speaking with workers at the San Onofre plant during the special inspection in September 2018. NRC learned that the dry cask storage crew experienced uncommon difficulty in aligning the spent fuel canister for downloading on July 22, 2018. The spent fuel canister had hung up several times while they were attempting to download it into the UMAX ISFSI. What was typically a 15-minute evolution ended up requiring an hour and a half of manipulation. Ultimately, the crew achieve the download, but only after swapping out the rigger for a more experienced member of the crew and equipping themselves with a stronger flashlight.

The most important difference between the July 22nd and August 3rd event was that during the July 22nd issue, the loaded spent fuel canister was always supported by the important to safety rigging equipment. The cask loading crew was aware of and attentive in identifying that the July 22nd misalignment had occurred and quickly recognized the binding and worked to achieve proper alignment to download the canister. During the August 3rd event, the cask loading crew was inattentive and unaware of the status of the spent fuel canister, which in-turn allowed the transporter operator to fully lower the rigging features to the seated position. This left the important to safety rigging equipment coiled up on the ground, near the base of the transporter, with 20+ feet of slack. The spent fuel canister was wedged and solely supported by an estimated 2.25 square inches of the metal on the internals of the vault system. Had the canister shifted off the ledge of vault internals, with the rigging equipment completely slack, the canister would have fallen an estimated 18 feet to the floor of vault. The licensee was unaware of this condition until a radiation protection technician alerted them that radiation levels were not consistent with those of a downloaded canister. During the August 3rd event, the canister was fully unsupported by the slack rigging equipment at a position roughly 18 feet above the bottom of the ISFSI vault for about 45 minutes.

The Special Inspection Team found that although the July 22nd event had been documented in a Production Traveler, it had never been entered into the site's corrective action program. This finding was cited as a failure to enter deviations experienced in downloading conditions into its corrective

action program to determine the cause of the misalignment and develop corrective actions to preclude reoccurrence.

… The NRC's inspection documented that San Onofre management failed to ensure that appropriate oversight was provided to its contractor workforces during important-to-safety evolutions. SCE has completed four causal evaluations; identifying numerous corrective actions, procedure enhancements, and new equipment; and implemented new training requirements. NRC is now confident in SCE's ability to properly oversee dry fuel storage operations at SONGS.[2]

Q11: What assessment did SCE make about its oversight of dry fuel storage operations at SONGS?

A11: According to the June 25, 2020 Apparent Cause Evaluation Report 1219-54559, a copy of which SCE provided in response to an A4NR data request, the San Onofre Nuclear Oversight Division ("NOD") was "ineffective at identifying precursors to events of significance."[3] As described in the Report,

- The NOD Manager was not dedicated and independent. At the time of the MPC #67 event, the Manager of NRA/NOD/NSC was holding multiple positions at the same time. There were competing priorities and conflicts of interest. During the period in question, the Manager was significantly involved in NRA actions and was not fully engaged in NOD activities. [p. 4 of 30]
- it was determined that the new MPC to FHB seismic stop base plate interfered with the seismic support from the previous dry fuel storage system. A field modification was performed without sufficient technical justification or the required or the required 72.48/50.59 review. [p. 7 of 30]
- During the process of removing the foreign material a worker was instructed to stand in front of the camera to block the view of the

[2] NRC, Frequently Asked Questions and Answers Regarding the August 3, 2018, Canister Misalignment Event at SONGS and the NRC Special Inspection, undated, pp. 4 – 7. Accessible at https://www.nrc.gov/reactors/operating/ops-experience/songs-spec-insp-activities-cask-loading-misalignment.html

[3] SCE Apparent Cause Evaluation Report 1219-54559, p. 3 of 30. This document is Attachment A to this testimony.

retrieval effort. The Cask Loading Supervisor (CLS) instructed the crew members to keep the FME event to themselves. [p. 7 of 30]

- Holtec encountered difficulties during downloading of Canister MPC #26; resulted in a 1.5-hour delay. The difficulties were not entered into the Corrective Action Program (CAP). [p. 7 of 30]
- During a procedure review, it was determined that the seismic analysis limits of HI-PORT edge clearance and drop deck height had not been followed during fuel transport operations. [p. 8 of 30]
- ACE 1218-59856 found procedure HPP-2464-400 did not have sufficient detail to comply with seismic analysis. [p. 8 of 30]
- During an inspection, the NRC identified an issue that the Wireless Load Shackles and Load Cell Pins, procured as Important-to-Safety Class B (ITS-B), did not meet all procurement specification requirements. [p. 8 of 30]
- ACE 0219-52380 found Holtec Procurement personnel associated with purchasing the Wireless Load Shackles did not adhere to written instructions due to inattention to detail. [p. 8 of 30]
- During dry runs to demonstrate the process for moving spent fuel from the FHB to the VVMS on the ISFSI, the VCT HI-TRAC support strap (belly band) was removed when the VCT was 10-15 feet away from the target CEC. [p. 8 of 30]
- ACE 0219-22465 determined that Holtec justified brief periods of operation of the VCT outside the seismic analysis based on a probabilistic risk rationale, which does not meet Holtec UMAX licensing requirements for a deterministic analysis of design basis events regardless of the probability. [p. 8 of 30]
- PTP Project Manager issued AR 0419-35707 documenting that various crews noted hang-ups during downloading of twenty-nine (29) canisters. There were no ARs or Oversight observations made regarding this fact because they followed the 400 procedure. [p. 8 of 30]
- NOD Assessment NODB 742 stated in part that “NOD is not providing effective oversight of Holtec FTO.” [p. 8 of 30]
- Prior to the August 2018 downloading event, there were multiple errors made by Holtec in the field that should have been indicators of underlying performance issues. [p. 9 of 30]
- NOD assessments performed between March and August 2018 reflect very little oversight of Holtec. [p. 10 of 30]
- During the period of July 15, 2018 (the loss of FME event) to August 03, 2018 (the actual downloading event), NOD Personnel made very few plant entries. During the period of the review, there were four (4) total entries into the PA and one (1) entry into the ISFSI. [p. 10 of 30]
- The lack of NOD presence was apparently not viewed upon as a problem by NOD management; it appears that there was an overreliance on the

integrated/holistic oversight approach and assumptions that the other integrated/holistic oversight constituents would provide sufficient oversight in NOD's absence. [p. 12 of 30]

- An example of another potential conflict of interest was the inappropriate action related to the decision not to report the August 3, 2018 downloading event to the NRC. The NRA/NOD/ECP Manager was wearing multiple hats at the time; he was part of the decision resulting in the late reporting of MPC Serial #67. [p. 13 of 30]
- SO123-XII-1.3 does not clearly establish NOD authorities and duties and does not assure full station support of NOD at the highest level of management. [p. 14 of 30][4]

Q12: What did the NRC learn from its interviews with onsite personnel at SONGS?

A12: According to the December 19, 2018 Revised NRC Special Inspection Report 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001 and Revised Notice of Violation:

> 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

[4] A4NR-SCE-005 Response to Question 05.

know until afterwards that the condition they experienced was something that should have been anticipated.

… 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.[5]

Q13: How did SCE respond to the NRC Notice of Violation?

A13: By an April 23, 2019 letter to the NRC's Enforcement Office from Doug Bauder, SCE's Chief Nuclear Officer and Vice President, Decommissioning, SCE indicated its acceptance of the Notice of Violation and its payment of the $116,000 Civil Penalty.[6] SCE paid the fine using shareholder funds.[7]

Q14: Did the NRC provide a less formal explanation of the violations to the SONGS Community Engagement Panel ("CEP")?

[5] Revised NRC Special Inspection Report 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001 and Revised Notice of Violation, December 19, 2018, pp. 8, 10 – 11. Accessible at https://www.nrc.gov/reactors/operating/ops-experience/songs-spec-insp-activities-cask-loading-misalignment.html This document is Attachment B to this testimony.

[6] Doug Bauder, SCE Chief Nuclear Officer and Vice President, Decommissioning, letter to Director, Office of Enforcement, NRC, re: Docket Nos. 50-206, 50-361, 50-362 and 72-41 Reply to a Notice of Violation, EA-18-155, and Statement of Method of Payment San Onofre Nuclear Generating Station (SONGS), Units 1, 2, 3, and ISFSI, April 23, 2019, p. 2. Accessible at https://www.nrc.gov/reactors/operating/ops-experience/songs-spec-insp-activities-cask-loading-misalignment.html

[7] PubAdv-SCE-MW5-001 Response to Q 04(b).

A14: Yes. At the CEP's March 28, 2019 public meeting, Scott Morris, the NRC's Regional Administrator, stated:

> I want to make one point very clear, we have a well-established enforcement policy, the severity level 1, 2, 3, and 4 violations we can issue. Some of which -- the more significant of which we can issue civil penalties, right, fines. There were five key violations issued during the special inspection we did back in September, three of which were our lowest severity level; they were level 4s; they were documented in the inspection report as such, right.
>
> … The remaining two issues were much more -- or potentially much more significant, and that's why we had a pre-decisional enforcement conference in January, again, publically [sic] observable, documented and archived on our website.
>
> … and where we came out, frankly, was unprecedented. For an interim storage, spent fuel storage installation, this agency, to my knowledge, has never issued a violation of severity level 2 violation ever, period. So this was a big -- this was a big deal, and that's also why -- and the civil penalty that went along with it, just further affirms the significance of this matter.
>
> You might ask, well, why wasn't it a severity level 1? Well, that's because there was no actual consequence, right, the canister didn't actually drop. It could have, the potential was there, but it didn't happen. If it had, you know, I'd bet my next paycheck it would have been a severity level 1, which would have been much more significant. But, again, the violations that we issued were unprecedented in their severity level for an ISFSI, okay. I want to make that point.[8]

Q15: What is your recommendation regarding the Joint Application's request to recover the costs attributable to the 14-month decommissioning schedule delay that resulted from the August 3, 2018 incident?

A15: $45.9 million (2014 dollars) of the Joint Application's $606.7 million (2014 dollars) request for recovery should be disallowed as unreasonable, based on the partially redacted

[8] CEP Reporter's Transcript, March 28, 2019, pp. 75 – 77.

table included in SCE's September 17, 2022 supplemental response to TURN Data Request #1 Question 22 (this table is Attachment C to this testimony). This table revised upward two earlier estimates from SCE's April 20, 2022 Response To Cal Advocates Data Request #1, Question 4.a., and SCE's March 28, 2022 response to SCE-A4NR-001 Question 14.d. As acknowledged in SCE's testimony, the Commission's well-established "reasonable manager" standard is "based upon what the utility knew or should have known at the time the utility took the actions."[9] Here the utility has admitted to failings in reporting, training, and oversight that it knew or should have known could jeopardize successful completion of the SNF transfers, and it has accepted liability for safety violations which the NRC characterized as being of unprecedented severity for an ISFSI. As the August 3, 2018 incident and its aftermath were described in a 2021 National Academies of Science, Engineering and Medicine webinar by Professor David Victor, SCE's handpicked chair of the SONGS CEP:

> … that led to a whole lot of personnel changes; led to a lot of acrimony, even with the contractor; and stuff that we got in the middle of; and, frankly, led to a huge erosion of trust for the operator and for the contractor that's wholly needless.
>
> The operations were poor. Let me just say that for a while my relations with the operator and Holtec were very poor because we said publicly, I said publicly, a lot of things that were accurate and very critical – and they were apoplectic.
>
> But operations were very poor and there was a kind of cowboy approach to this that's led to a complete overhaul of the downloading operations, more monitoring, more cameras, more safety checks and redundancies and so on – frankly, more nuclear operations – in a way that was a little loosey-goosey previously.
>
> I will say one of the things I learned in that process was that the kinds of best practices movement of ideas and best practices in operations across different industrial facilities that is normal for operational plants was

[9] SCE-01, p. 15.

not happening for decommissioning activities – that, I think, is now happening to a greater degree for decommissioning activities.

And then, to make things worse, Edison did an extreme, the operator did an extremely poor job of communicating accurately in a timely way, and that – the combination of the two – was a big hole. And people stopped digging, finally. And then they've climbed out from that hole. And we're more or less back to where we were before. But we should have never gone down that.[10]

III. DEFICIENCY: THE JOINT APPLICATION'S CONTINUING RELIANCE ON IMPLAUSIBLE ASSUMPTIONS FOR THE REMOVAL OF SPENT NUCLEAR FUEL ("SNF") FROM THE SONGS SITE TO SIZE THE DECOMMISSIONING COST ESTIMATE ("DCE") FOR UNIT 1 AND FOR UNITS 2&3.

Q16: Why do you consider the SNF removal date assumptions in the DCEs for Unit 1 and Units 2&3 to be implausible?

A16: Because the current DCEs mechanically recycle, for the sixth time since the 2005 NDCTP, a formulaic adjustment to the demonstrably inaccurate assumption used in the immediately preceding NDCTP, heedless of the cumulative impact on the credibility of the resultant DCEs. SCE characterizes its credulous assumption that the Department of Energy ("DOE") will begin accepting SNF nationally in 2031 as "generally consistent with assumptions used by the rest of the nuclear power industry in their DCEs,"[11] but recent history makes clear that SCE itself does not believe that. The company's March 15, 2021 "Strategic Plan for the Relocation of SONGS

[10] September 2, 2021 presentation to "Laying the Foundation for New and Advanced Nuclear Reactors in the United States Meeting #7," National Academies of Science, Engineering, and Medicine. Accessible at https://youtu.be/ykhqAfme0ZI

[11] SCE-07, p. 1, footnote 1.

Spent Nuclear Fuel to an Offsite Storage Facility or a Repository" ("SONGS SNF Strategic Plan") observed, "Whether the current [decommissioning] schedule [i.e., which contemplated completion of SONGS decommissioning by year-end 2051, now relaxed to year-end 2053 by the A.22-02-016 DCEs] can be met depends to a significant extent on whether an offsite consolidated interim storage facility is available … in the 2035–2045 timeframe."[12]

But the "Action Plan" (which is Attachment E to this testimony) released concurrently with the SONGS SNF Strategic Plan, and specifically endorsed by SCE's senior management, debunked the commercial reasonableness of reliance on any interim storage proposal – like the high-profile private projects being licensed in New Mexico and Texas – that would reduce the federal government's current responsibility for transportation, storage, and liability costs once SNF leaves the SONGS site:

> These plans offer an analysis of the costs, opportunities and challenges of relocating spent nuclear fuel from a commercial utility and its customers. The evaluation found it unlikely that the SONGS co-owners and their customers would find a commercially reasonable path to move the spent nuclear fuel without federal government involvement. This is consistent with SCE's strong belief that its customers should not be exposed to additional costs or risks when it is the federal government's legal and contractual obligation to provide a solution.[13]

The Action Plan further elaborated:

> Recognizing that no offsite facility currently exists that could accept the SONGS SNF and GTCC [i.e., greater than Class C] waste, the Strategic Plan explores a range of alternative pathways for pursuing this overarching objective. Several factors were considered, most critically the ability to

[12] SONGS SNF Strategic Plan, p. 4. This document is Attachment D to this testimony.

[13] Action Plan, unnumbered first page. In addition to the SONGS SNF Strategic Plan and the Action Plan, SCE also released a "Conceptual Transportation Plan for the Relocation of SONGS Spent Nuclear Fuel to an Offsite Storage Facility or Repository" on March 15, 2021.

> provide an offsite solution that (1) meets rigorous regulatory requirements for safety and protection of public health and the environment and (2) can be implemented in a commercially reasonable manner.
>
> The results of the analysis, from both the Strategic and Conceptual Transportation Plans, point to a clear distinction between pathways that rely on the federal government's longstanding contractual and statutory obligation to take title to commercial SNF and remove it from plant sites, versus pathways that do not presume a central federal role. Put simply, a federal solution, or at least one that encompasses a significant degree of federal support, offers the surest and most achievable path to relocating the SONGS SNF. All other alternatives create uncertain but potentially large risks and costs and thus are far less likely to meet the test of commercial reasonableness, which encompasses critical considerations of cost, cost recovery, title and liability. The steps outlined in this Plan thus reflect an emphasis on federal action as the key to resolving the core SNF management challenges facing SONGS.[14]

Q17: What did the SONGS SNF Strategic Plan say about the institutional context for offsite solutions with the federal government playing the central role?

A17: According to the SONGS SNF Strategic Plan,

> **The U.S. nuclear waste program has suffered from a lack of stable organization and management at the federal level.** [emphasis in original] Prior to the NWPA [i.e., Nuclear Waste Policy Act], nuclear waste management had to compete for resources with other areas of nuclear R&D. [footnote omitted] To bring more focused attention to the program, the NWPA established the Office of Civilian Radioactive Waste Management (OCRWM) within DOE and made the OCRWM director equivalent to an assistant secretary, appointed by the President and confirmed by the Senate. Despite standing up this new program, and as a result of changes in the budget treatment of NWF revenues, the nuclear waste management program continued to be vulnerable to changing policy direction and appropriations levels under different administrations and Congresses.

[14] Action Plan, p. 2. As the Action Plan noted, "The criterion of commercial reasonableness is articulated in detail in the August 2017 Settlement Agreement Regarding Coastal Development Permit for Storage of San Onofre Spent Nuclear Fuel that prompted the development of these Plans; it is also a standard that any utility, given its fiduciary responsibility to customers and shareholders, would apply in making decisions that have potentially significant cost and liability implications." *Id.,* footnote 5.

> Ultimately, OCRWM was defunded and dismantled in 2010, along with the termination of the Yucca Mountain project…
>
> When the OCRWM was still active, appropriations for its waste management activities ranged from a low of $197 million in FY 2010 to a high of $576 million in FY 2004 ... From FY 2005 through FY 2010, however, appropriations decreased every year and in FY 2011, the Obama administration ceased requesting funds altogether for the waste management appropriations accounts. [footnote omitted]
>
> No appropriations were made in FY 2011, nor have they been made in any year since. The Trump administration has requested appropriations in each of its budget requests (for FYs 2018, 2019, and 2020), but no funds were appropriated in any of these years. [footnote omitted] The small remaining balance of funds from prior year appropriations continues to be expended in small amounts for administrative costs.
>
> Though Congress could restart appropriations from the NWF at its discretion, there are practical impediments that would need to be overcome given the long lapse that has now occurred in funding and program activity. A 2017 Government Accountability Office (GAO) report outlined three necessary actions for restarting the Yucca Mountain project, in particular: recruiting personnel (at the time of its disbandment, OCRWM had about 180 staff and utilized thousands of contractor personnel—much of this capacity and institutional experience has been lost; in addition, other key agencies, including the NRC, would also need to rebuild capacity); updating key documents (i.e., the Yucca Mountain license application, environmental impact statement, and safety evaluation report); and rebuilding physical infrastructure, including reopening field offices and information technology and document management systems. Most of these actions will be required to restart a comprehensive waste management program whatever is decided about Yucca Mountain.[15]

Q18: What time frames did the SONGS SNF Strategic Plan estimate for reliance on a permanent federal repository for disposal of SONGS SNF?

A18: According to the SONGS SNF Strategic Plan,

> Unfortunately, these timeframes are virtually impossible to estimate. For reasons already discussed, it is extremely difficult to predict whether and

[15] SONGS SNF Strategic Plan, pp. 36 – 39.

when the federal government might resolve the issue of restarting a national repository program focused on Yucca Mountain or on a new site. [footnote omitted] An additional source of uncertainty concerns federal funding to implement the program.

If work on Yucca Mountain does resume, several key milestones will have to be reached before the repository can begin accepting SNF from SONGS. A first milestone involves licensing and the start of construction. NWT [i.e., the consultant that authored the SONGS SNF Strategic Plan] estimates that a decade or more would be needed to complete the licensing process for Yucca Mountain. This includes time needed for:

- Rehiring and retraining personnel and contract staff,
- Restarting activities at DOE and the NRC,
- Completing the adjudication of various contentions admitted by the ASLB,
- Reconsidering the EIS [i.e., Environmental Impact Statement] record of decision on the rail alignment from the existing mainline track to Yucca Mountain,
- Obtaining congressional approval for land withdrawal legislation, and
- For the NRC to issue construction authorization.

This estimate further assumes that the various contentions are resolved in favor of the project, the state of Nevada does not litigate the outcome, and the state issues necessary permits. Continued efforts by the state to block construction, on the other hand, could cause significant further delays.

If the federal government instead decides to seek another repository site, additional time will be needed for site identification and characterization studies. That additional time could be offset, at least in part, if a different approach to siting proved successful in gaining both potential host state and community acceptance, and thereby reduced the time required for NRC licensing and possibly other steps in the process.

A second milestone involves repository construction and operation. This involves the following steps:

- DOE to substantially complete construction of the repository and connecting rail line,
- DOE to prepare and submit a request for license issuance to receive and possess, and
- NRC to review the DOE submittal and issue the 10 CFR 63 operating license.

Constructing the repository and surface facilities, conducting pre-operational testing, and obtaining an operating license from the NRC, together with completing necessary transportation infrastructure, could require an additional decade or more. [footnote omitted] This puts the timeframe for initial SNF acceptance at two to three decades from the date that a national decision is reached to restart the Yucca Mountain project. [footnote 154: 'In addition, funding and time would be required to re-establish the human capital and site infrastructure needed at Yucca Mountain to conduct these activities, given that all of these assets were completely eliminated over the last decade.'] Given the current uncertainty about whether and when Congress might act to restart the repository program, these estimates suggest that a federal disposal facility is unlikely to be available as a destination for SONGS SNF until mid-century or beyond.

A third milestone involves shipping the SONGS SNF to a federal repository. Once a federal repository is opened, the schedule for shipping SONGS SNF will depend upon the established acceptance allocation processes for SNF at shutdown plant sites ... SONGS has a favorable position in the Standard Contract "oldest fuel first" (OFF) queue in terms of being able to initiate SNF shipments because SONGS Unit 1 began operating in 1968. [footnote omitted] The last DOE-published schedule for shipments to a repository, however, would result in only about one-third of SONGS SNF being shipped within the first decade of repository operations.

Under the current ordering of the OFF queue, completing the shipment of all SONGS SNF could take a total of two to three decades. However, as discussed in Subsection 6.3.5, if the federal government exercises its contractual right to give priority to SNF from shutdown reactor sites, it can prioritize the acceptance of SNF from those sites in a way that would allow SNF to be removed from the SONGS site in under ten years once acceptance begins. [footnote omitted]

Based on the above estimates, even if a decision is made to restart the Yucca Mountain project within the next year or so, it could take more than five decades from the time repository construction begins (and potentially much longer due to various uncertainties) to clear the SONGS site of all SNF and GTCC waste.

As already noted, the timeline for developing a geologic repository at another site is subject to similarly high levels of uncertainty and could take an equivalent amount of time. For example, if Congress authorized the initiation of a new repository program in 2021, and if that program followed the notional schedule milestones outlined in the 2013 DOE Strategy Report, [footnote omitted] the time needed to open a facility, after accounting for appropriate consultation and coordination with host states, tribes, and communities, could be three to four decades. In this scenario, clearing the

SONGS site could take as long or even longer than in the Yucca Mountain scenario described above.

Thus, absent a more near-term off-site interim storage solution, a realistic timeline for a federal repository means that waiting for this disposition pathway to become available could mean maintaining the SONGS ISFSI over a considerably longer timeframe than the current Decommissioning Plan assumes.

… The main schedule uncertainty for this [federal repository] alternative concerns the time to resolve the current impasse and reach a decision to move forward, either with Yucca Mountain or a new site. Once a decision is made, the time needed to reconstitute the federal program, find a new site (if necessary), and license and construct the facility adds additional schedule uncertainty. Finally, once a repository is available, the timeframe for removing SNF from SONGS will depend on the rate at which SNF is accepted by the federal government for disposal, which in turn will depend on whether and how DOE exercises its authority to prioritize the acceptance of SNF from shutdown reactors. Overall, NWT estimates that the time needed to complete the removal of all SONGS SNF in this alternative could be as long as five to seven decades after congressional action to restart the federal program.[16]

Q19: What time frames did the SONGS SNF Strategic Plan estimate for reliance on a federal consolidated interim storage facility for SONGS SNF?

A19: According to the SONGS SNF Strategic Plan,

From a statutory and regulatory risk perspective, this alternative has much in common with the default scenario of waiting for federal action to open a geologic repository as required under current law. In both cases the federal government assumes responsibility for removing the SNF and bears associated costs. And in both cases, it is difficult to predict when the federal facility might actually become available and how the Standard Contract queue would affect the schedule for transferring SONGS SNF and fully clearing the SONGS site. Developing a federal CISF [i.e., consolidated interim storage facility] would likely require a change in current law before construction could begin to de-link construction from a repository

[16] *Id.,* pp. 80 – 82.

construction authorization ... This adds an element of time and uncertainty associated with the need for congressional action.

In this regard, the current impasse over the future direction of SNF management policy at the national level constitutes a barrier, much as it does in terms of restarting the repository program. Prospects for successfully siting a federal CISF are likewise uncertain, although the technical issues associated with characterizing, licensing, and constructing a storage facility would be much less demanding than for a geological repository.

... This disposition pathway requires action by Congress to direct and fund establishment of a new interim storage program. The timeframe to implement a federal storage facility would also depend on how a new interim storage program is linked to the development of a permanent repository.

Once Congress provides necessary appropriations and/or authorization, the federal government would need to take several steps to develop CISF capability. Based on the experience of private CISF developers, NWT estimates the following timeframes:

- Facility development, including site evaluations; consultation with affected state, local, and tribal governments; site characterization; engineering design, and licensing—could take a decade or longer.

- The NRC licensing process could take three to four years, reflecting experience to date with entities that are currently seeking CISF licenses. [footnote omitted]

- Construction and opening of CISF facilities could take two to three years.

In total, we assume the timeline for site selection, including consent-based process, design, and licensing could take about 10 to 20 years. This is consistent with DOE's 2013 *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, which estimated a timeline of about 8 years to implement a pilot interim storage facility and 12 years to implement a larger CISF with capacity of 20,000 MTU. [footnote omitted] DOE assumed that once open, the CISF would incrementally increase its storage capacity. Assuming DOE achieved a receipt rate of 3,000 MTU per year, then 22 years after opening, the CISF would be expected to have a capacity of 50,000 MTU.

Once a federal CISF is opened, the likely time to removal of the first and last SNF canisters from SONGS would depend on the number of other SNF owners seeking offsite storage and the order for acceptance of SNF from different sites. Figure 7.1 shows that the inventory of SNF at shutdown plant

sites is projected to grow significantly over the next 20 years. Even if authorizing legislation restricts use of a federal CISF to SNF from shutdown sites, SONGS would have to 'compete' with a growing number of other sites over the next decade and beyond. Depending on the prioritization process established by the federal government, the time required to ship all SNF from SONGS could take anywhere from significantly less than a decade (the estimate in the current SONGS Decommissioning Plan) to possibly two or more decades. As with the federal repository alternative discussed previously, we estimate that all SNF could be removed from the SONGS site relatively expeditiously (i.e., in less than five years after federal receipt of SNF begins), if the federal government adopts an acceptance and transport strategy that is focused on emptying shutdown sites as quickly as possible.

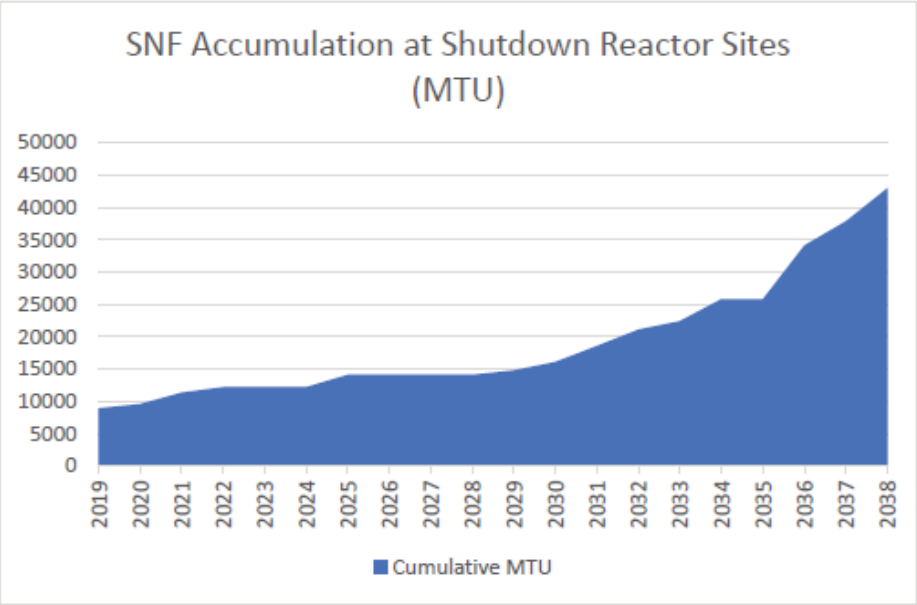
In summary, beginning with establishment of a federal interim storage program and presuming full funding and prioritization of shutdown sites, we estimate that it could take two to three decades, from the time a federal CISF program is initiated, to clear all SNF canisters from the SONGS site.

... Congress could provide entirely new authorization for a federal interim storage program. Two key issues would need to be addressed in such legislation:

• How to design a consolidated interim storage program in a manner that would be truly viewed as "interim" in nature – i.e., what provisions would be needed to address linkages to the development of a permanent disposal facility ...

• What criteria should be used to determine SNF eligibility for transfer to the federal CISF and to prioritize shipments from particular sites (i.e., the OFF queue or prioritization for shutdown sites). We assume that authorizing legislation would limit use of the federal CISF to SNF from shutdown reactor sites, but with the number of shutdown sites likely to increase over time, there will be a need to establish criteria for prioritizing among these sites ... Expected growth in the overall inventory of SNF at shutdown sites is shown in Figure 7.1. The figure shows a potential 50 percent increase in SNF at shutdown sites by 2030, and a potential four-fold increase by 2040.

Figure 7.1 SNF Accumulation at Shutdown Reactor Sites



Source: Gutherman Technical Services, LLC

… Any timeframe for action by Congress on this alternative is highly uncertain, especially since the issue of linkage between a federal CISF and a permanent repository is likely to provoke intense debate. Even if Congress decides to move forward with a federal CISF and appropriates funds accordingly, political and legal challenges could be expected to emerge in response to any proposed CISF site.

An added siting challenge for a federal CISF, as distinct from a federal repository, could also come from otherwise supportive parties who might worry that with no repository even on the horizon, any CISF will become a de facto permanent storage facility. This is why the linkage issue, as we have already noted, is important and would likely need to be addressed as part of any new authorizing legislation to allow this alternative to go forward.

… We estimate that the complete removal of SONGS SNF could take three to four decades following congressional authorization of a federal CISF. There are many factors that could extend this timeframe; on the other hand, if a facility moves forward, adoption by the federal government of an optimized system for accepting SNF from shutdown sites could reduce the schedule significantly.

The linkage between federal CISF and permanent disposal capability has been a longstanding issue in U.S. nuclear waste management policy. This is true as well for interim storage solutions that do not involve the federal

government, since host communities and states will want to have confidence that a permanent solution will be forthcoming.

> The SONGS co-owners can expect that the timeframe for transferring title and responsibility for SONGS SNF to the federal government (for either a federal CISF or repository) will be affected by the Standard Contract queue. This will directly affect the time required to remove all SNF from SONGS in the event that a federal storage or disposal facility becomes available. The Standard Contract explicitly authorizes the federal government to prioritize the acceptance of SNF from shutdown nuclear plant sites but does not specify how acceptance would be prioritized among those sites. As growing numbers of plants are retired across the United States, it will be increasingly important to address this issue if DOE's contractual authority to prioritize shutdown sites is exercised.[17]

Q20: What time frames did the SONGS SNF Strategic Plan estimate for reliance on federal use of a privately developed consolidated interim storage facility for SONGS SNF?

A20: According to the SONGS SNF Strategic Plan,

> In this scenario, the federal government takes title to the SNF, removes it from SONGS, and transports it to the private CISF where the canisters are returned to interim storage service. At that point, the private CISF owner would take possession of the material under its 10 CFR 72 license, but the federal government would retain title and pay the CISF owner for storage service until such time as the federal government ships the material to a geologic repository or other permanent disposal facility.
>
> … From the standpoint of the SONGS co-owners and customers, there is no difference between this disposition pathway and one in which the federal government removes SONGS SNF for transfer to a federal facility (whether a federal CISF or a federal repository). In both cases, the federal government assumes title to the SNF and responsibility for transport and all other offsite storage or disposal costs at the SONGS site boundary.
>
> … A non-federal CISF can be licensed and operated under current law and regulations. However, this alternative would require changes to federal law to allow the federal government to transport SNF to a facility that is not currently authorized under the NWPA and to allow the federal government to enter into commercial agreements with CISF owner(s)/operator(s).

[17] *Id.,* pp. 85 – 92.

> … We estimate that the SONGS SNF could be completely removed within a timeframe of approximately two decades once one or more non-federal facilities that can accept all of the SNF have been fully licensed and operational and once the federal government has been authorized to contract with those facilities for storage services. However, the timing of federal authorization to enter into such contracts and the schedule for federal acceptance of SNF from different shutdown sites if such authorization is granted and contracts with the facility owners are successfully negotiated, remain key sources of uncertainty.[18]

Q21: Does the federal government's current effort to develop a consent-based siting process for consolidated interim storage facilities for SNF include federal use of a privately developed facility, such as those proposed in New Mexico and Texas?

A21: No, during DOE's December 21, 2021 webinar on consent-based siting, Principal Deputy Assistant Secretary for the Office of Nuclear Energy Dr. Kathryn Huff made clear that DOE is focused on identifying a site for a federal facility.[19]

Q22: What effect on time frames for removal of SNF from SONGS did the SONGS SNF Strategic Plan attribute to the DOE "queue"?

A22: According to the SONGS SNF Strategic Plan,

> … a key parameter in current U.S. nuclear waste policy is the existence of a queue that would govern the order in which SNF would be accepted for shipment to a "DOE facility"— whether a federal repository for disposal or another facility (e.g., a consolidated interim storage facility) to which DOE may ship SNF prior to final disposal. [footnote omitted]
>
> … One of DOE's defined responsibilities under the Standard Contract is to issue "an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository." The Contract goes on to state that this priority

[18] *Id.,* pp. 92 – 99.
[19] Consent-Based Siting Q&A With Dr. Kathryn Huff, December 21, 2021, accessible at https://www.energy.gov/ne/consent-based-siting 17:51 – 19:00.

ranking "shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such material from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance…." While this "oldest fuel first" (OFF) principle is used to allocate rights to available annual acceptance capacity among contract holders based on the age of the oldest SNF in still in their possession, contract holders are free to use their annual acceptance rights for any SNF in their possession, at any site, that meets other acceptance criteria specified in the contract. [footnote omitted]

… SONGS has a favorable position in the queue in terms of initiating early shipments of SNF due to the early start of operation of SONGS Unit 1. The last published schedule for shipments to a repository, however, would result in only about one-third of SONGS SNF being shipped within the first decade of repository operations.

… This initial 10-year allocation totals 499 MTU. The quantity of SNF being stored at SONGS (from all three SONGS reactor units) totals approximately 1,600 MTU. Under the current ordering of the queue, completing the shipment of all SONGS SNF could take a total of two to three decades.

It has been suggested that positions in the Standard Contract OFF queue could be monetized—in other words, that SNF owners could pay other owners to change places for a more favorable position in the acceptance ranking. Under the Standard Contract, utilities have a contractual right to make such exchanges with other contract holders, subject to DOE's right, "in its sole discretion," to "approve or disapprove…any such exchanges." Thus, SCE could negotiate with other nuclear utilities to move SONGS's allocation forward in the queue, subject to DOE approval. In the 2008 DOE report discussed below, DOE stated that in order to avoid the equity issues that might result from using its authority to give priority to acceptance from shutdown sites, "the government has consistently advised the parties seeking such priority treatment to avail themselves of the exchange provisions of the Standard Contract." A legal analysis of the provisions of the Standard Contract performed for the Blue Ribbon Commission on America's Nuclear Future concluded that a market for such exchanges would likely develop. [footnote omitted] However, in order to clear the SONGS site completely in the first 10 years after the federal government starts accepting SNF, the SONGS co-owners would have to acquire acceptance rights for an additional 1,100 MTU from other utilities having those rights in that period. Since no market for rights has yet developed, the costs of acquiring the needed rights are uncertain.

A fundamental inefficiency built into the OFF queue is that it could lead to a large number of sites each shipping a relatively small amount of SNF each year. For example, in year 10 of the 2004 Acceptance Priority Ranking

report, 46 SNF owners have allocations that would allow shipping SNF from 63 different sites. One study estimated that with shipments coming from the sites having the annual allocation (i.e., the SNF owners do not use the rights to ship fuel from other reactors they own), an average of 58 sites would be shipping SNF in any given year during the period in which the total annual acceptance capacity was 3000 metric tons. While the number of shipping sites could be reduced to some extent if the eight SNF owners with more than one reactor site used their allocations to concentrate their deliveries on one site, the owners with only one reactor site would not have that option.

This potential fragmented allocation of acceptance rights among multiple sites based on an OFF-based queue increases costs to the government for the service due to system inefficiency and also substantially extends the time that it would take to remove the SNF from sites after the last reactor has shut down. Fixed costs to SNF owners for storage operations (primarily for security) do not decrease proportionally with SNF inventory reduction; rather, they cease completely only after all SNF is removed from the site. This issue has become a growing concern as the projected time for start of federal waste acceptance has slipped from 1998 in 1982 to 2010 in 2004 to an unknown date today, while the number sites with shutdown reactors is expected to grow rapidly starting in the next decade. As of the end of 2020, there are 19 shutdown nuclear plant sites in the United States with ISFSIs that are storing spent fuel from 22 reactors ... The owners of these plants will likely all have an interest in moving their SNF off site. These numbers are expected to increase to 25 shutdown nuclear plant sites with spent fuel from 31 reactors in 2025 and 38 sites/56 reactors in 2040. [footnote omitted] Figure 7.1 … shows the projected accumulation of SNF at shutdown plant sites over the next two decades, assuming no removal to a central storage facility or repository. [footnote omitted] This situation was not contemplated when the Nuclear Waste Policy Act was enacted in 1982 and the Standard Contracts were developed and signed pursuant to the Act shortly thereafter.

… Because the OFF framework is embodied in the Standard Contract, an effort to simply change it by legislation could trigger damage claims from affected contract holders. [footnote omitted] Section B.1(b) of Article VI of the Standard Contract gives DOE the discretion to prioritize acceptance of SNF from shutdown plant sites, independent of the order that would be dictated by the OFF queue. DOE using this discretion, therefore, requires no change to the Standard Contract language. However, DOE has been reluctant to use that discretion in the past. In a 2008 report to Congress [footnote omitted] pertaining to a program for storing SNF from decommissioned reactor sites, DOE noted that it has declined many requests to exercise its contractual discretion to prioritize acceptance of SNF

from such sites on the grounds that this would delay timely removal of SNF from operating reactor sites. DOE's stated concern is that this could raise equity issues that could lead to further litigation from other contract holders. DOE concluded that legislation establishing a mandated storage program would need to 'expressly direct the Department to exercise its discretionary authority under the Standard Contract to take SNF from the decommissioned reactors on a priority basis…' [footnote omitted][20]

Q23: What effect on time frames for removal of SNF from SONGS did the SONGS SNF Strategic Plan attribute to the federal Judgment Fund?

A23: According to the SONGS SNF Strategic Plan,

> Since DOE has still not begun accepting commercial SNF, despite the 1998 deadline specified under the NWPA and in DOE's Standard Contract with nuclear plant operators, multiple utilities have sued for partial breach of contract. As a result of settlements or final judgments in these suits, a total of $8.6 billion had been paid out by the U.S. Treasury's Judgment Fund through the end of September 2020. [footnote omitted] As noted previously in the main text, the Judgment Fund pays out all costs incurred by the federal government as result of litigation. While 104 cases have been concluded (with 88 cases resulting in payments from the Judgment Fund), 16 cases remained pending as of the end of FY 2020. [footnote omitted] Each year without work on a permanent repository adds to the federal government's future liability under similar lawsuits: in 2017, the DOE Inspector General audit estimated this liability at $27.2 billion; in 2018, the figure was $28.1 billion; [footnote omitted] in 2019, the figure was $28.5 billion; and in 2020, the figure was $30.6 billion. [footnote omitted] However, the latest estimate assumes that work towards a DOE facility (assumed to be either Yucca Mountain or a federal CISF) resumes by FY 2023. If this does not occur, resulting delays will increase the federal government's total liability, which, according to some estimates, may eventually reach $50 billion. [footnote omitted]
>
> The fact that the NWF is subject to appropriations, but the Judgment Fund is not, creates dysfunctional incentives that tend to favor continued delay over action on nuclear waste. Doing nothing to advance a long-term solution, while simply paying utilities damages for the continued storage of spent fuel at reactor sites requires no affirmative action by either the administration or

[20] SONGS SNF Strategic Plan, pp. F-2 – F-10.

> Congress (it is in effect a mandatory expenditure). By contrast, any expenditures from the NWF to implement waste disposal program activities requires annual congressional appropriations that count against appropriations caps and require the allocation of funding away from other discretionary spending priorities. This competition exists despite the fact that the NWF is self-funded, in contrast to the rest of the DOE budget...[21]

Q24: What is your assessment of the combined effects of the Action Plan and the SONGS SNF Strategic Plan on the plausible time frames for complete removal of SNF from SONGS?

A24: All commercially reasonable alternatives to the status quo require major changes in law by Congress as a trigger to starting the calculation of time frames. This unavoidable fact means, according to the estimates of the SONGS SNF Strategic Plan, five to seven decades post-trigger for a permanent repository; three to four decades post-trigger for a federal CISF; and, for federal use of a non-federal CISF, two decades after sufficient capacity is licensed and operational and legislation enacted authorizing such federal use. Only this third alternative could be hypothetically consistent with the current SONGS DCEs, but would require reliance on the two non-federal CISFs currently in development and would appear to contradict the federal government's promotion of a consent-based siting process for such facilities. The SONGS SNF Strategic Plan's estimated time frames for each of these three alternatives rely on simplifying, and optimistic, assumptions about the DOE queue which seem likely to require embrace by Congress in order to materialize. Federal responsibility for title to and transportation of SNF at the ISFSI fence line are necessary prerequisites for the SONGS co-owners to vary from the status quo of onsite storage, and satisfaction of DOE's breach of contract liabilities through the

[21] *Id.,* p. 36.

Judgment Fund is a sedative that reinforces congressional inertia irrespective of local preferences. Cal. Pub. Util. Code § 8323 directs the Commission to shape its NDCTP process to "promote realism in estimating costs, provide periodic review procedures that create maximum incentives for accurate cost estimations, and provide for decommissioning cost controls." The SONGS SNF Strategic Plan establishes that any commercially reasonable alternative to indefinite storage of SNF in the SONGS ISFSI will rely on speculative assumptions about the timing and content of congressional action.

Q25: What is your recommendation regarding SCE's request to deposit its share of future DOE litigation proceeds into the respective SONGS non-qualified nuclear decommissioning trusts rather than returning them directly to current customers?

A25: It should be approved as a reasonable, though tardy, response to a problem first pointed out by A4NR in A.14-12-007 (when SCE assumed DOE would begin SNF removals nationally in 2024): false confidence in an inert federal SNF program understates decommissioning costs; undermines the funding adequacy of the decommissioning trusts; and transfers financial risks to future ratepayers who are increasingly unlikely to have ever received electricity from SONGS. Eight years later, SCE has been forced to acknowledge this consequence:

> … sufficient funds are currently available to cover the cost of managing spent fuel through 2051. However, the recent change in the assumed DOE start date of 2031 required SCE to allocate approximately $44 million (100% share, 2014 $) from contingency to cover the assumed additional two years of spent fuel storage costs (moving the end date from 2049 to 2051). Continuing to fund the DOE's ongoing delay through an allocation of contingency is not sustainable. If DOE's failure to begin removing fuel from SONGS continues, there will be insufficient funds available in the NDTs to

cover the cost of spent fuel storage, maintenance, and protection.[19] [Footnote 19 in SCE-07 states: 'The 2020 SONGS 2&3 DCE includes approximately $55 million in contingency during the ISFSI only period. Contingency is not intended to be used for the type of activity discussed here, but if it was, the available contingency would only support a little over two years of ISFSI activities.']

As discussed above, since DOE litigation proceeds are returned to customers, there is no current mechanism to offset the increased costs due to DOE's delay. For example, over four NDCTP cycles (i.e., a further 12-year DOE delay) the SONGS DCEs would increase by $264 million (100% share, 2014 $), which would have a negative impact on the NDTs. Without a funding option and with continued delays by DOE, the negative impact on the NDTs will be exacerbated.[22]

While SCE notes that implementation of its proposal "would avoid the issue of intergenerational equity with SCE's current customers,"[23] this belated recognition comes after $67 million of earlier DOE litigation proceeds for the 2014 – 2016 SNF storage costs paid from the decommissioning trusts were refunded to current customers.[24] The decommissioning trusts began collections from ratepayers in 1988, statutorily designed to charge the full costs of decommissioning to the users of SONGS electricity. The logic of gifting DOE reimbursements to current ratepayers (apart from the universal desire to keep rates down), while the funding sufficiency of the trusts depends upon make-believe assumptions about DOE performance that imperil future ratepayers, has never been clear to me. Nevertheless, to mitigate the substantial majority of future SNF cost risk (i.e., that portion which SCE can successfully recover from DOE litigation or settlement), SCE has proposed a workable trust replenishment mechanism that

[22] SCE-07, p. 8, lines 7 – 19.
[23] *Id.,* p. 11, lines 22 – 23.
[24] *Id.,* p. 6, Table III-1.

deserves Commission support. To do any less would ignore the blunt truths about federal SNF policy contained in the SONGS SNF Strategic Plan.

IV. DEFICIENCY: THE JOINT APPLICATION'S DEFERRAL OF REMOVAL OF UNITS 2&3 SUBSURFACE STRUCTURES UNTIL ALL SNF LEAVES THE SONGS SITE, NOTWITHSTANDING THE REQUIREMENT IN COASTAL DEVELOPMENT PERMIT ("CDP") 9-19-0194.

Q26: What other deficiencies has A4NR identified in the Joint Application that adversely impact the SONGS DCEs?

A26: The Joint Application and accompanying testimony provide inadequate support to find reasonable the DCE for SONGS Units 2&3 because of their failure to reflect compliance with Special Condition 3 of CDP 9-19-0194, which authorized the Units 2&3 onshore decommissioning work to begin. Special Condition 3 requires SCE to return within six months of completion of the permitted project (and not later than June 1, 2028) with a permit amendment application for the removal, to the extent feasible, of all remaining onshore structures at SONGS that may be exposed in the future due to coastal processes or that otherwise would have coastal impacts if they were to remain. Despite this clear direction from the California Coastal Commission, the DCE assumes such removal can be delayed indefinitely until all spent nuclear fuel has been removed from the SONGS ISFSI.

The Joint Application simply perpetuates an assumption about the timing of removal of these subsurface structures that was contained in the 2018 Application, **before** the adoption of

Coastal Development Permit 9-19-0194 and Special Condition 3. As this Commission reminded SCE and SDG&E in D.21-12-026, "we note that while the Utilities have presented DCEs reflecting the requirements adopted by other government agencies, they are expected to adapt and modify future DCEs to reflect changes in site operations, economic conditions, available technology, and regulations."[25] The Utilities' failure to do so, and the resultant multi-decade delay in removal of subsurface structures, likely causes the costs of such removal to be unduly inflated compared to a schedule consistent with Coastal Development Permit 9-19-0194 and Special Condition 3.

As summarized in the Coastal Commission staff report prepared for the consideration of Coastal Development Permit 9-19-0194 (which was subsequently approved October 17, 2019 by unanimous vote):

> SCE proposes to remove large portions of the above- and below-grade elements of Units 2 and 3 and associated infrastructure. However, the proposed project would leave significant amounts of foundation, footings, and other existing material in place and would cover them with backfill. Over time, coastal processes, exacerbated by sea level rise, could cause portions of remaining structures to become exposed, which would cause potential risk to public safety and marine life, as well as impacts to visual resources and public access. Staff is recommending several conditions to address these concerns. Special Condition 3 would require the applicant to return within six months of completion of the proposed project [and not later than June 1, 2028] with **a permit amendment application that includes the proposed removal, to the extent feasible, of all remaining onshore structures at SONGS that may be exposed in the future due to coastal processes or that otherwise would have coastal impacts if they were to remain.**[26] [emphasis added]

[25] D.21-12-026, p. 61, citing D.16-04-019, p. 16, and Cal. Pub. Util. Code §§ 8326 and 8327.
[26] California Coastal Commission staff report on Application 9-19-0194, September 26, 2019.

Q27: What was the historical context for Special Condition 3?

A27: SCE decided in November 2017 to delay commencement of removal of the onshore substructures by what it then estimated would be 18 years, from 2028 to 2046, thereby (1) severing such work by some two decades from the dismantlement of the above-ground structures; (2) requiring a separate contractor solicitation and mobilization at highly uncertain costs; and (3) delaying the time when the public can regain access to coastal resources as guaranteed by the Public Trust Doctrine, the Coastal Act, and the California Constitution, until all spent nuclear fuel is removed from the SONGS ISFSI. Additionally, the slippage in state permitting, which pushed the start of above-ground dismantlement from early 2018 to early 2020, was triggered by SCE's modification of the CEQA project description 22 months into the process – a modification SCE said "was primarily related to SCE's decision to defer substructure removal to a future time closer to when SCE would return the property to the U.S. Department of the Navy."[27] As SCE explained in a data response to TURN, the change "simplified the EIR by pushing more activities into the category of "future work" not analyzed in detail in the EIR."[28]

SCE offered two different non sequiturs as explanation for the change, suggesting a less than coherent analysis. On the one hand, SCE stated that its August 2017 study of coastal processes "predicted greater erosion than expected, causing SCE to re-evaluate certain assumptions about the timing of substructure removal."[29] While briefing materials prepared by SCE on the study results were emphatic ("Based on these results, extensive removal of

[27] A.18-03-009, SCE-01, p. 7, lines 4 – 5.
[28] TURN-SCE-001 Response to Q 24.
[29] *Id.,* p. 8, lines 14 – 16.

subsurface structures will likely be required to avoid future exposure."[30]), SCE did not explain why (or how) delaying removal of the substructures would avoid or mitigate this future exposure. On the other hand, SCE also justified the anticipated two-decade delay in removal of the SONGS 2&3 substructures as enabling a consolidated dewatering scheme with the removal of SONGS 1 substructures (located beneath the ISFSI) that will take place after the ISFSI has been decommissioned. This consolidation would consequently subordinate removal of the SONGS 2&3 substructures (and restoration of public access to coastal resources) to the removal of all spent nuclear fuel from the ISFSI – assuming that eventually happens. The A.18-03-009 DCE estimated this future consolidated dewatering cost at $43.254 million (2014 dollars)[31] and attributed some $18 million (2014 dollars) in savings to the consolidation.[32] But the savings claim was undermined by the fact that dewatering had been expressly removed from the scope of work for the substructures removal cost estimate prepared for the A.18-03-009 DCE. As SCE explained in response to a data request from A4NR:

> As the planning for a detailed dewatering estimate (to be prepared by High Bridge Associates) was initiated, it became evident that SCE did not have (nor could have) detailed, information regarding environmental regulations, dewatering techniques, etc., that would be in place in the 2050 time frame. This information/assumptions would be needed to prepare a more refined estimate than the conceptual estimate previously prepared by EnergySolutions as part of the 2014 SONGS 2&3 DCE. Accordingly, SCE decided to not incur the expense to prepare a new conceptual estimate.[33]

[30] A.18-03-009 A4NR-SCE-02, Response to Q.41, "Briefing on SONGS Coastal Processes Study Prepared by Southern California Edison," October 16, 2017, p. 7. SCE indicated this briefing paper was used to inform the SONGS participants (i.e., owners), the State Lands Commission, the Coastal Commission, the Energy Commission, the SONGS Community Engagement Panel chair, and CPUC staff.
[31] A.18-03-009 A4NR-SCE-02, Response to Q.34.
[32] A.18-03-009 A4NR-SCE-02, Response to Q.42.
[33] A.18-03-009 A4NR-SCE-02, Response to Q.39.

The Commission approved the A.18-03-009 DCE in D.21-12-026 and I am not suggesting that it be relitigated – rather, that the carryforward of the subsurface structure removal assumptions to the current Units 2&3 DCE be reviewed with two material changes in fact fully understood.

Q28: What material changes in fact since the A.18-03-009 DCE was prepared do you believe are relevant to the subsurface structure removal assumptions in the current Units 2&3 DCE?

A28: The first is Special Condition 3 to CDP 9-19-0194, which I have discussed above. This is a binding legal requirement for an amended permit application, not merely – as SCE appears to assume – a paper study. Pursuant to 14 CCR § 13156, when the Coastal Commission acts upon this amendment of CDP 9-19-0194, it will either specify a time for commencement of the approved work or commencement will be required two years from the date of the Coastal Commission vote upon the application. Unless SCE expects to persuade the Coastal Commission that no subsurface structure removal is feasible – in which case the inclusion of $274 million in the current DCE for removal of all subsurface structures is unreasonable – then it will need to justify any deferral of such work. Even if SCE's current "uncertain" assumption is correct, that DOE will begin meeting its SNF obligations nationally in 2031[34] and removal of the Unit 2&3 substructures can commence in 2048, SCE-04 envisions a 20-year period of "Dry Storage Only" after the Units 2&3 decontamination and dismantlement work is completed in 2028. It will be difficult to reconcile two decades of fenced-off quarantine of an idle 68-acre site (i.e., the 84-acre Navy Easement minus the 16-acre ISFSI) in the middle of a popular state

[34] SCE-07, p. 1, line 15.

beach with the public access to coastal resources guaranteed by the Public Trust Doctrine, the Coastal Act, and the California Constitution.

The second material change in fact relevant to the subsurface structure removal assumptions is SCE's implicit acknowledgment through its Action Plan and the SONGS SNF Strategic Plan that even a 20-year quarantine of the idle Units 2&3 site is wildly optimistic. Clearly, the prerequisite for DOE contractual performance is congressional enactment of some variation of the sweeping measures discussed in the SONGS SNF Strategic Plan. Even were such a development to occur tomorrow – and no one has suggested it could – the SONGS SNF Strategic Plan estimated the required time after enactment for a federal CISF to begin receipt of SNF at 10 – 20 years, assuming a consent-based siting process. Although more ambiguous, the discussion of federal reliance on one or more privately developed CISFs did not suggest a quicker post-enactment path to initial DOE performance. And if Congress bypasses interim storage in favor of retaining the NWPA's focus on a permanent repository, whether Yucca Mountain or an alternative site, the SONGS SNF Strategic Plan projected initial DOE performance at 30 – 40 years post-enactment. Assuming a 2031 DOE start date is unreasonable, based upon what SCE learned, or should have learned, from the SONGS SNF Strategic Plan.

Q29: What are the ramifications of a 20-year or longer quarantine of the non-ISFSI SONGS site?

A29: The Coastal Commission has been a vigorous defender of the public's coastal access rights, and timely enforcement of Special Condition 3's requirements should be presumed in

the DCE. The California State Lands Commission ("CSLC") added a provision to its 2019 SONGS offshore conduits lease with SCE that will shrink the Exclusion Area Boundary to the 100-meter minimum buffer around the ISFSI permitted by 10 CFR 72.106. The NRC's written summary of a February 23, 2021 teleconference with SCE to discuss this shrinkage observed, "it [i.e., SCE] shared with the NRC that there is public interest in unfettered access to the Beach at SONGS."[35] This perspective was echoed in an August 4, 2022 interview conducted by SCE's regulatory and oversight manager, Al Bates, with VICE News:

> The goal is to make the hulking old plant essentially disappear, Bates told VICE News, leaving no trace of the infrastructure that stood for over 50 years and once generated around 9 percent of California's electricity. Today, as Bates put it, 'It's the boneyard of a nuclear plant. I envision a sand volleyball court right here,' he said, gesturing toward a pile of debris. 'It's going to go back to essentially what was here to begin with, which was a beach.'[36]

The importance of the public's coastal access rights should have been apparent to SCE in the preparation of the DCE.

It is also unclear how a prolonged period of idleness on the 68-acre non-ISFSI portion of the SONGS Easement will comport with the Navy's policies regarding its management of real property interests. Policy 2.e.(2)(a) of the Secretary of the Navy's June 26, 2019 SECNAVINST 11011.47D, which will arguably govern any extension of the existing SONGS Easement, states:

> Each easement entered into under the authority of this instruction shall contain the following:

[35] NRC, "SUMMARY OF FEBRUARY 23, 2021, PRE-SUBMITTAL TELECONFERENCE WITH SOUTHERN CALIFORNIA EDISON ON REQUEST FOR PROPOSED EXEMPTION TO 10 CFR 72.106(b) (L-2021-LRM-0027)," March 17, 2021, unnumbered p. 1., accessible at https://www.nrc.gov/docs/ML2107/ML21075A283.pdf

[36] Accessible at https://www.vice.com/en/article/epzz87/california-nuclear-power-climate-change

> (a) A right in the Government to terminate for default based on non-use for a period of two consecutive years or abandonment …[37]

Whether the ongoing use of the 16-acre ISFSI site would be sufficient to negate such concerns about non-use of the 68-acre Units 2&3 site is unknown, but the Navy's repeated public assertions of its interest in the prompt return of its SONGS property is consistent with Policy 2.b.:

> Allowing use of DON property by others, even for short periods of time, may have consequences that are detrimental to fulfilling Navy and Marine Corps readiness missions. Accordingly, it is important to carefully consider the effects any use will have on potential future military requirements before entering into agreements for non-naval use of DON real property. [38]

Multi-decade stasis at the SONGS Unit 2&3 site may also run afoul of recent public policy concerns about the intersection of the public trust with sea level rise. The Coastal Commission recently closed the public comment period on its "Draft Public Trust Guiding Principles & Action Plan" (developed in coordination with CSLC staff under a grant from the Office for Coastal Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce) and is expected to take action shortly. The draft contains the "following principles to guide the Coastal Commission in its sea level rise adaptation work":

> 1. The climate crisis and sea level rise are moving the public trust landward.
>
> 2. Development decisions and sea level rise will impact public trust lands, uses, and resources.
>
> 3. The Coastal Commission has an affirmative duty to carry out the public trust doctrine.

[37] A4NR-SCE-001 Response to Question 04, attachment, p. 24.
[38] *Id.,* p. 17.

4. Protections for the public trust will be incorporated into Coastal Commission decision-making.

5. Anticipated impacts to current and future public tidelands will be identified.

6. Coastal Commission findings will be informed by interagency coordination.

7. Implementing the public trust doctrine through Coastal Commission actions can advance environmental justice.

8. Shoreline protective devices adversely impact public trust resources.

9. Owners of shorefront property may not unilaterally prevent the landward migration of public trust lands.

10. Encouraging the use of nature-based adaptation strategies will help support public trust uses and values.[39]

Draft principles 1, 4, 7, 8, 9, and 10 are likely to be most pertinent to the Units 2&3 site, especially if the Units 2&3 sea wall (which the CSLC's Final Environmental Impact Report, citing SCE, described as "not needed to protect the Approved ISFSI from natural events"[40]) is perceived over time as impeding the landward migration of the mean high tide line accompanying sea level rise. At some point, the ambulatory boundary principle underlying *United States v. Milner* may be applied to the SONGS Easement:

> By this logic, both the tideland owner and the upland owner have a right to an ambulatory boundary, and each has a vested right in the potential gains that accrue from the movement of the boundary line. The relationship between the tideland and upland owners is reciprocal: any loss experienced by one is a gain made by the other, and it would be inherently unfair to the tideland owner to privilege the forces of accretion over those of erosion.

[39] California Coastal Commission, Hearing Item Th6e (June 9, 2022), pp. 4 – 5, accessible at https://www.coastal.ca.gov/public-trust/

[40] CSLC, Final Environmental Impact Report for the San Onofre Nuclear Generating Station (SONGS) Units 2 & 3 Decommissioning Project, Volume II, p. 1-19, lines 4 – 5.

> Indeed, the fairness rationale underlying courts' adoption of the rule of accretion assumes that uplands already are subject to erosion for which the owner otherwise has no remedy.[41]

Notably, the Coastal Commission staff paper introducing the Draft Public Trust Guiding Principles and Action Plan observed:

> Unlike much upland coastal property, tidelands are often open to all visitors at no or low cost and are thus critical from an environmental justice standpoint as an important resource to provide equitable coastal access.[42]

SCE's plan to idle 68 acres at the center of the San Onofre State Beach for a period of at least two decades (and probably longer), while speculating about the political odds of slicing the Gordian knots that constrain SNF policy, and protected by a seawall that after 2028 will shield nothing beyond the usurping of public trust tidelands, cannot reduce the eventual cost of removal of the Units 2&3 substructures. To the extent that removal costs escalate at a rate greater than the assumed investment return on trust assets – a premise of every DCE nationally that has opted for DECON over SAFSTOR – deferring that work indefinitely will increase the eventual cost. More fundamentally, a DCE that neglects to include compliance with Special Condition 3 of CDP 9-19-0194 cannot be considered reasonable.

Q30: What is your recommendation?

A30: The SONGS Unit 2&3 DCE should be disapproved as unreasonable. Alternatively, any approval should be conditioned on the requirement that SCE's and SDG&E's 2024 NDCTP filing

[41] *United States v. Milner*, 583 F.3d 1174, 1188 (9th Cir. 2009).
[42] California Coastal Commission, Hearing Item Th6e (June 9, 2022), p. 3.

reflect the full removal of all Units 2&3 subsurface structures as soon as practicable after approval by the Coastal Commission of the permit amendment required by CDP 9-19-0194 Special Condition 3.

APPENDIX: QUALIFICATIONS OF JOHN GEESMAN

John L. Geesman is an attorney with the law firm, Dickson Geesman LLP, and a member in good standing of the California State Bar.

Mr. Geesman served as a member of the California Energy Commission from 2002 to 2008, and was the agency's Executive Director from 1979 to 1983. While a Commissioner, he chaired the Commission's Facilities Siting Committee during a period when nearly two dozen new power plants were approved for construction. Between his two tours at the Energy Commission, Mr. Geesman spent nineteen years as an investment banker focused on the U.S. bond markets and served as a financial advisor to municipal electric utilities throughout the western states.

Mr. Geesman has a long history of engagement with issues related to regulatory compliance, resource planning, environmental policy, financial management, and risk practices. This is demonstrated by his service in numerous leadership capacities, including stints as:

- Co-Chair of the American Council on Renewable Energy;
- Chairman of the California Power Exchange;
- President of the Board of Directors of The Utility Reform Network (nee Toward Utility Rate Normalization);
- Member of the Governing Board of the California Independent System Operator; and,
- Chairman of the California Managed Risk Medical Insurance Board.

Mr. Geesman has testified as an expert witness before the California Public Utilities Commission on many occasions. He is a graduate of Yale College and the University of California Berkeley School of Law.

ATTACHMENT A:

SCE Apparent Cause Evaluation Report 1219-54559

June 25, 2020

Apparent Cause Evaluation

Revision 0, Effective 08/20/2019

Action Request: 1219-54559

Event Title: NOD Ineffectiveness

Event Date: December 18, 2019

Report Revision: 0

Report Date: June 25, 2020

Reviews and Approvals

Evaluator:	_____ *Print Name & Initial*	**Date:** _____
Division Manager:	_____ *Print Name & Initial*	**Date:** _____
MRC Chair:	_____ *Print Name & Initial*	**Date:** _____

CAPCO Note: Reviews/Approvals occurred during MRC Skype meeting on 06-24-2020 in accordance with COVID 19 Protocols. MRC quorum was met per SO123-XV-50 (CAP), and the MRC meeting included Roland LaBeaf (Evaluator), Jim Madigan (Division Manager), and Lou Bosch (MRC Chair). John Osborne

Cause Evaluation Legal Disclaimer

Consistent with the San Onofre Nuclear Generating Station's corrective action program, this cause evaluation evaluates, through the use of an after-the-fact hindsight-based analysis, conditions adverse to quality and the causes of those conditions. The information identified in this cause evaluation was discovered and analyzed using all information and results available at the time it was written. These results and much of the information considered in this evaluation were not available to the organizations, management, or individual personnel during the time frame in which relevant actions were taken and decisions were made. Consistent with the requirements of 10 C.F.R. Part 50, Appendix B, Section XVI, SCE's cause evaluations have been established as a means to document and "assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected," and, as necessary, to ensure that actions are taken to prevent recurrence.

This cause evaluation does not attempt to make a determination as to whether any of the actions or decisions taken by management, vendors, internal organizations, or individual personnel at the time of the event were reasonable or prudent based on the information that was known or available at the time they took such actions or made such decisions. Any individual statements or conclusions included in the evaluation as to whether errors may have been made or improvements are warranted are based upon all of the information considered, including information and results learned after-the-fact, evaluated in hindsight after the results of actions or decisions are known, and do not reflect any conclusion or determination as to the prudence or reasonableness of actions or decisions at the time they were made.

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EXECUTIVE SUMMARY

Introduction

On August 03, 2018, SONGS experienced a Multi-Purpose Canister (MPC) downloading event in which MPC Serial #67 became wedged on the shield ring flange approximately eighteen (18) feet above the bottom of the storage module. Following the event, Fuel Transfer Operation (FTO) was halted pending the understanding of causes and implementation of corrective actions as to reduce the risk of another event. Holtec performed Root Cause Analysis QI 2529 (The MPC Downloading Incident at SONGS) and SCE performed ACE AR 0818-20356 (Assessment of SCE Oversight Effectiveness during MPC Serial #67 Downloading Event). Implementation of resultant corrective actions, along with additional actions, supported resumption of FTO based on a low risk of another event of significance.

In April 2019, Plant management developed a concern for the effectiveness of the overall quality assurance oversight process at SONGS, and AR RCE 0419-27809 (Evaluation of NOD and DA Oversight of Fuel Transfer Operations and Decommissioning Activities) was generated to further understand oversight performance. The corrective action set resulted in implementation of an extensive set of actions in the areas of NOD and DAO performance, further reducing the risk to an event of significance. Currently, the station remains at a low risk to an event of significance.

At the direction of the current NOD Manager, this ACE 1219-54559 supplements RCE 0419-27809 in the area of NOD performance. The purpose is to identify any remaining gaps in performance and implement corrective actions to close the gaps.

Summary of Analysis and Results

As the primary analysis tool, the ACE Team developed an Event & Causal Factors Chart based on available objective evidence and information provided during the interview process. This analysis resulted in multiple inappropriate actions; however, since the inappropriate actions were similar in nature, they were combined into a single repetitive inappropriate action to avoid redundancy. The repetitive inappropriate actions were further investigated to identify the Direct Cause, the Apparent Cause and the Contributing Causes. The results of the ACE are summarized below:

Problem Statement: The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to events of significance.

Repetitive Inappropriate Action (RIA): Insufficient Engagement in Holtec Activities

Direct Cause No. 1: Insufficient NOD Field Presence
NOD was not in the field to the level necessary to observe the adequacy of Holtec process controls and behaviors as to recognize and act upon event precursors.

Contributing Cause No. 1: Inadequate Program Monitoring
The NOD did not conduct effective critical and objective assessments of their own performance, including the review of the lesser events leading up to the MPC #67 event as to capture their lessons learned and make adjustments.

Corrective Action: 1) Develop and execute a plan for NOD to conduct periodic self-assessments of NOD programs, processes, and performance and 2) Establish and implement a Learning Opportunity Review Process (Missed-Opportunity) Procedure.

Contributing Cause No. 2: Utilization and Allocation of Resources
There were insufficient resources in the form of personnel and quality procedures available to provide a sufficient level of oversight of Holtec field activities.

Corrective Actions: 1) Augment the base SCE NOD staff with qualified and experienced contractor personnel (Action Completed); 2) Develop and execute a Bi-Weekly NOD schedule, based on risk, which integrates field observation activities with mandated assessments; and 3) Revise Procedure SO123-XII-1.3 (Authorities and Duties of Nuclear Oversight Division Personnel) to close the gaps identified in the Barrier Analysis. In addition, conduct benchmarking of a high performing Oversight department at a decommissioning station and incorporate improvements into NOD processes.

Apparent Cause No. 1: No Dedicated and Independent NOD Manager
The NOD Manager was not dedicated and independent. At the time of the MPC #67 event, the Manager of NRA/NOD/NSC was holding multiple positions at the same time. There were competing priorities and conflicts of interest. During the period in question, the Manager was significantly involved in NRA actions and was not fully engaged in NOD activities.

Corrective Action: Hire an independent QA Manager to lead the Nuclear Oversight organization. (Action Completed)

PROBLEM STATEMENT

The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to events of significance. This condition resulted in increased Fuel Transfer Operations (FTO) Project risks, and in regulatory and financial impacts.

Object: The San Onofre Nuclear Oversight Division (NOD)

Deviation: Was ineffective at identifying precursors to Holtec events of significance.

Consequences(Actual and Potential): Increased Fuel Transfer Operations (FTO) Project risks, and regulatory and financial impacts.

Note: *The condition (i.e., NOD ineffectiveness) existed in the period leading up to the Holtec August 2018 canister downloading event and is not indicative of current performance. After the event, there were cause evaluations and corrective actions that improved Holtec field and Quality Assurance performance, Decommissioning Agent Oversight (DAO) performance, and NOD performance, resulting in the approvals to resume FTO activities. This ACE focuses on a review of past NOD performance to identify remaining gaps and determine causes and corrective actions to close the gaps.*

EXTENT OF CONDITION

The intent of this Extent of Condition analysis is to identify where else the same, or similar, conditions are in existence, but adverse impact has not yet occurred at SONGS. The scope of this Extent of Condition is directly related to the Problem Statement of this ACE. For ease of reading, the Problem Statement is repeated below:

> *The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to Holtec events of significance. This condition resulted in increased Fuel Transfer Operations (FTO) Project risks, and regulatory and financial impacts.*

The team convened to discuss potential similar objects and defects. The ACE Team determined that for this Extent of Condition, the Object would be expanded to include "Other Station Oversight Organizations" and the Deviation was modified to "Was ineffective at identifying precursors to events of significance other than Holtec FTO (e.g., other major contractors on site that may perform quality affecting work)."

Extent of Condition Summary:

***Same-Same Tier*:**

Question: Does the potential currently exist for NOD to be ineffective at identifying precursors to Holtec FTO events of significance.
Response: Yes

Analysis of the *Same-Same* Tier: This tier is the subject of the ACE. Corrective actions were developed based on the identification of causes. See Corrective Action Matrix.

***Similar-Same Tier*:**

Question: Does the potential exist for other Station Oversight Organizations to be ineffective at identifying precursors to Holtec FTO events of significance.
Response: Yes, but the risk is low.

Analysis of the *Similar-Same* Tier: This tier is related to the potential that other Station Oversight Organizations to be ineffective at identifying precursors to Holtec FTO events of significance. Currently, other than the oversight provided by NOD, other oversight of Holtec FTO is performed by DA Oversight Specialists and the Contract Technical Representatives (CTRs). Current performance is at an acceptable level. Therefore, there are no immediate concerns for the performance of the CTRs and DA Oversight Specialists. Actions already taken by the DA Oversight organization address this condition and no further actions are recommended at this time.

***Same-Similar Tier*:**

Question: Does the potential currently exist for NOD to be ineffective at identifying precursors to events of significance other than Holtec FTO (e.g., other major contractors on site that may perform quality affecting work).
Response: Yes, but the risk is low.

Analysis of the *Same-Similar* Tier: This tier is related to the potential for NOD to be ineffective at identifying precursors to events of significance other than Holtec FTO. Currently, SONGS Decommissioning Solutions (SDS) is the primary decommissioning contractor at SONGS and their Quality Assurance is performing at an acceptable level. No additional actions required

See Attachment 1 for Extent of Condition Worksheet.

IMMEDIATE ACTIONS

None, as noted in the Problem Statement: "The condition (i.e., NOD ineffectiveness) existed in the period leading up to the August 2018 canister downloading event and is not indicative of current performance.

EVENT DESCRIPTION

On August 03, 2018, SONGS experienced a Multi-Purpose Canister (MPC) downloading event in which MPC Serial #67 became wedged on the shield ring flange approximately eighteen (18) feet above the bottom of the storage module. The event resulted in a suspension of spent fuel transfer operations at SONGS and the issuance of an NRC Severity Level II Violation.

After the downloading event, the Nuclear Oversight Board (NOB) identified multiple issues (gaps) associated with the station's lack of organizational effectiveness. The following two (2) issues are directly related to this cause evaluation: 1) Vendor Quality Assurance; and 2) Effectiveness of Quality Assurance.

In May of 2019, Root Cause Evaluation (RCE) 0419-27809, *Evaluation of NOD and DA Oversight of Fuel Transfer Operations and Decommissioning Activities* was conducted to "evaluate the effectiveness of the broader site-wide oversight structure and activities including both Nuclear Oversight Department (NOD) and the Decommissioning Agent (DS) and their interactions." A corrective plan was developed, and actions were taken to improve oversight. During implementation of the actions, the NOD Manager recognized the potential for gaps to remain in NOD performance as the RCE was focused on an integrated approach to oversight rather than an independent and specific review of NOD performance. As a result, the NOD Manager directed the generation of an ACE to specifically review NOD performance leading up to the August 2018 MPC #67 event.

On December 18, 2019, Nuclear Oversight Division (NOD) personnel created Action Request (AR) 1219-54559 with a problem description of: "Contrary to the DQAP and 10CFR50, Appendix B, the "integrated" oversight process in place at SONGS challenges the authority and organization freedom of NOD to identify quality problems and to verify implementation of corrective actions." This AR was generated with consideration of NOD performance in the timeframe of the August 2018 MPC Serial #67 event and, therefore, the characterization is not indicative of current performance. The AR, per NOD Manager direction, was to supplement RCE 0419-27809 and its corrective action set by performance of this ACE to identify and correct any remaining gaps in performance.

SEQUENCE OF EVENTS

The following sequence of events, identifying key activities/conditions and inappropriate actions applicable to the event, was developed based on document reviews, previous cause evaluation products and verifiable information that was provided during interviews/discussions with station personnel:

Spent Fuel Transfer Operations and ISFSI Loading

1) 01/22/2018: Holtec started loading spent fuel into MPCs and transporting MPCs from the Plant spent fuel pool into Vertical Ventilated Module (VVM) storage casks in the ISFSI.

2) 01/23/2018: NRC night shift inspector requested to see the 72.48 evaluation/screen that approved the installation (December 2017) of the Unit 2 Fuel Handling Building (FHB) seismic restraint system; it was determined that the new MPC to FHB seismic stop base plate interfered with the seismic support from the previous dry fuel storage system. A field modification was performed without sufficient technical justification or the required or the required 72.48/50.59 review.
RIA-1A: Insufficient Engagement in Holtec Activities

3) 03/2018: Holtec began dual Unit fuel transfer operations, despite SONGS concerns on identified Quality program issues. DA Oversight Specialists were moved to a new facilitative role as Contractor Technical Representatives (CTRs). CTRs worked as project coordinators helping Holtec perform their work to meet SONGS program requirements.

Precursors and MPC Serial #67 Downloading Event

4) 07/15/2018: Holtec crew had a loss of FME event (Spacer Measuring Tool separated and fell into an MPC. During the process of removing the foreign material a worker was instructed to stand in front of the camera to block the view of the retrieval effort. The Cask Loading Supervisor (CLS) instructed the crew members to keep the FME event to themselves. Reference Holtec FCR #2464-1174.
RIA-1B: Insufficient Engagement in Holtec Activities

5) 07/22/2018: Holtec encountered difficulties during downloading of Canister MPC #26; resulted in a 1.5-hour delay. The difficulties were not entered into the Corrective Action Program (CAP). Interferences were believed to be encountered at the mating device and the divider shield ring.
RIA-1C: Insufficient Engagement in Holtec Activities

6) 08/03/2018: During downloading of Canister MPC Serial #67 the canister became wedged on the shield ring flange approximately 18 feet above the bottom of the storage module. (EN#53605 and Holtec Root Cause Analysis QI 2529, “The MPC Downloading Incident at SONGS”)
RIA-1D: Insufficient Engagement in Holtec Activities

7) Spent fuel transfer operations at SONGS was suspended.

8) 09/14/2018: During the NRC inspection exit brief, the lead inspector identified an apparent NOV for the failure to report as “ongoing”. Following the NRC briefing, a 72.75(d)(1) report was sent to the NRC (EN 53605), restoring compliance with the regulation. Because the notification was made following NRC identification as ongoing it was considered an NRC-identified issue.
IA-1: Downloading Event was Not Reported to the NRC
[Note: This issue was addressed in Root Cause Evaluation (RCE) 1218-33805; no additional analysis is required for this ACE under evaluation.]

Post MPC Serial #67 Downloading Event

The below sequence of events to varying extents validates the above RIA of Insufficient Engagement in Field Activities.

9) 12/20/2018: During a procedure review, it was determined that the seismic analysis limits of HI-PORT edge clearance and drop deck height had not been followed during fuel transport operations.

- ACE 1218-59856 found procedure HPP-2464-400 did not have sufficient detail to comply with seismic analysis.

10) 01/28/2019: During an inspection, the NRC identified an issue that the Wireless Load Shackles and Load Cell Pins, procured as Important-to-Safety Class B (ITS-B), did not meet all procurement specification requirements.

- ACE 0219-52380 found Holtec Procurement personnel associated with purchasing the Wireless Load Shackles did not adhere to written instructions due to inattention to detail.

11) 01/30/2019: During dry runs to demonstrate the process for moving spent fuel from the FHB to the VVMS on the ISFSI, the VCT HI-TRAC support strap (belly band) was removed when the VCT was 10-15 feet away from the target CEC.

- ACE 0219-22465 determined that Holtec justified brief periods of operation of the VCT outside the seismic analysis based on a probabilistic risk rationale, which does not meet Holtec UMAX licensing requirements for a deterministic analysis of design basis events regardless of the probability.

12) 04/2019: PTP Project Manager issued AR 0419-35707 documenting that various crews noted hang-ups during downloading of twenty-nine (29) canisters. There were no ARs or Oversight observations made regarding this fact because they followed the 400 procedure.

13) 06/25/2019: The new NOD Manager was onboarded.

14) 12/19/2019: NOD Assessment NODB 742 stated in part that *"NOD is not providing effective oversight of Holtec FTO*."

ANALYSIS and CAUSES

Note
This ACE was generated at the request of the NOD Manager for performance improvement purposes; therefore, the ACE focuses specifically on NOD performance.

ACE Team Make-up and Analytical Tools Used:
This ACE was performed by an internal/external cross-functional team with team members experienced in the areas of Nuclear Independent Oversight, Health Physics, Nuclear Construction, Maintenance, Plant Operations, and the Corrective Action Program (CAP). The

team conducted the evaluation in accordance with SCE CAP procedures, using multiple analytical techniques to determine the associated causes. The techniques used were Event and Causal Factors Charting (E&CFC) as the primary tool, Barrier Analysis as a secondary tool, Organizational & Programmatic Screening and a Safety Culture Aspects review to validate team conclusions. The analytical techniques were supported by document reviews, interviews, observations, and discussions with involved personnel to validate the sequence of events and gather pertinent insights to support identifying causes.

Summary of Analysis

E&CF Charting Analysis Summary:
As the primary analysis tool, the ACE Team developed an Event & Causal Factors Chart based on available objective evidence and information provided during the interview process. This analysis resulted in multiple inappropriate actions; however, since the inappropriate actions were similar in nature, they were combined into a single repetitive inappropriate action to avoid redundancy. The repetitive inappropriate actions were further investigated to identify the Direct Cause, the Apparent Cause and the Contributing Causes. The following is a summary of the Event & Causal Factors Charting analysis (see Attachment 2 for the complete Event & Causal Factors Charting analysis):

Analysis of Repetitive Inappropriate Action No. 1A, 1B, 1C and 1D:
Insufficient Engagement in Holtec Activities

Prior to the August 2018 downloading event, there were multiple errors made by Holtec in the field that should have been indicators of underlying performance issues. The following events, which should have been recognized and acted upon as event precursors to the downloading event, were used for this cause analysis:

- 01/23/2018: NRC night shift inspector requested to see the 72.48 evaluation/screen that approved a field modification was performed in December 2017 without technical justification and the required reviews. During Installation of U2 FHB Seismic Restraint System the New MPC to FHB seismic stop interfered with the existing seismic support. It was determined that the new MPC to FHB seismic stop base plate interfered with the seismic support from the previous dry fuel storage system.

- 07/15/2018: A loss of FME event occurred when a spacer measuring tool separated and fell into an MPC. During the process of retrieving the foreign material, the responsible Cask Loading Supervisor (CLS) instructed a worker to stand in front of the camera to block the view of the retrieval effort. Following successful retrieval of the foreign material, the CLS requested that the crew keep the loss of FME event to themselves.

- 07/22/2018: Holtec Encountered Difficulties During Downloading of Canister MPC #26. Interferences were believed to be encountered at the mating device and the divider shield ring. When the interference hang ups were identified, the sling still carried part of the load. There was no FCR/AR written, and no log entry made noting the hang up.

  ***Note**: Subsequent to the July 22, 2018 downloading difficulties, on April 15, 2019, the SCE Pool-To-Pad Project Manager initiated Action Request 0419-35707 to document: "An employee reported to me that during 29 previous MPC*

downloads, the crew had to stop download, come back up, adjust alignment, and gone back down, and sometimes repeat, on several occasions. This may explain some of the indications being observed on the MPC robotic inspections. The employee reported that it was common and happened to about half of the 29 MPCs." Based on the information contained in Action Request No. 0419-35707, there were indicators of downloading difficulties encountered by Holtec crews prior to the August 2018 downloading event; however, no effective actions were taken by Holtec to address downloading issues and the interference instances were not appropriately escalated and resolved.

NOD assessment NOBD 742, covering NOD activities performed between March 2018 and August 2018, noted the following (in part) based on interviews with NOD personnel:

"There are NOD independence and effectiveness challenges. ***NOD is not providing effective oversight of Holtec FTO***. One individual from NOD is assigned to oversight of FTO, and that person is also used to support other NOD activities, such as audits. NOD personnel are directed by NOD management to not conduct oversight of Holtec FTO but instead are directed to evaluate the performance of the DA oversight organization in their role of overseeing FTO. This arrangement does not meet the DQAP regarding NOD responsibility to assure quality activities at SONGS are performed in accordance with implementing procedures."

"NOD assessments performed between March and August 2018 reflect very little oversight of Holtec. FTO observed by NOD are primarily limited to Holtec dry run testing. The bulk of NOD assessments during this period address contractor corrective action program implementation and canister foreign material inspections."

"In some cases, NOD personnel provide DA oversight specialists with opportunities to initiate CAP documentation for problems identified by the NOD." "NOD assessment reports do reflect some in-process implementing procedure reviews, however, documented preemptive reviews are not used by NOD to confirm procedure compliance and adequacy prior to implementation."

NOD observations of FTO activities were made via remote camera viewing, without the use of headsets. Although acceptable, this method of performing observations does not afford the same level of engagement as actual field presence. Field observations and interactions with Holtec field personnel would have provided valuable insights into the culture of Holtec field work practices. In order to assess the amount of NOD field presence there was during the event precursors leading up to the canister downloading event, the ACE team performed a review of Protected Area (PA) and ISFSI entries performed by NOD personnel. During the period of July 15, 2018 (the loss of FME event) to August 03, 2018 (the actual downloading event), NOD Personnel made very few plant entries. During the period of the review, there were four (4) total entries into the PA and one (1) entry into the ISFSI.

Direct Cause No. 1: Insufficient NOD Field Presence
There was insufficient field presence to identify and act upon performance deficiencies prior to an event of consequence.

On January 23, 2018, an NRC night shift inspector requested to see the 72.48 evaluation/screen that approved the field modification that was performed in December

2017 without the appropriate level of technical justification and the required reviews. This issue came to light during an NRC inspection; the NRC inspector noticed a notch in the seismic stop and requested the 72.48 review documentation. SCE personnel only became aware of the event when the question was raised by the NRC inspector. The lessons learned from this event should have been captured in order to drive NOD engagement of Holtec field activities; however, NOD did not have an effective method of capturing missed opportunities (NOD did not have a missed opportunity procedure). A missed opportunity review would have been an excellent opportunity to gain valuable insights into Holtec's work culture, strengths and weaknesses. The fact that the NRC identified the problem in the field also demonstrates the importance of oversight field presence. NOD oversight of engineering activities would typically not occur until an engineering audit [after the fact – the potential to proactively prevent an event is missed].

The other event precursors (FME and Difficulties During Downloading of MPC #26 events) also presented potential learning opportunities for NOD. A Learning Opportunity Review Process (missed opportunity) procedure for NOD would have provided an excellent tool to capture the lesson learned from these event precursors. Additionally, a missed opportunity procedure could be a useful tool for personal accountability and performance improvement purposes. NOD personnel later recognized the potential benefit of a missed opportunity procedure and created Action Request 1219-38896 to document: "Recommendation: NOD should consider development and use of a "missed opportunity" procedure as it applies to the NOD. Such a procedure assesses whether the NOD should have identified problems that subsequently resulted in regulatory violations, root cause analysis, and/or the identification of problems by organizations external to the site, e.g., regulatory agencies, the NOB, etc." An assignment was generated from the Action Request to: "Review recommendation that NOD should consider development and use of a 'Missed opportunity' procedure as it applies to the NOD for implementation at SONGS." The ACE team strongly recommends development of the missed opportunity procedure [Ref. CA Matrix].

When SONGS was an operating plant, there was external criticism regarding the lack of effective benchmarking conducted for performance improvement opportunities. Personnel interviews found that some benchmarking was conducted during the development of the DQAP; however, benchmarking for the purpose of performance improvement has not been conducted. NOD is evaluated every two (2) years by an independent third party to ensure that NOD is in compliance with the DQAP. Self-Assessments are not required for NOD, but a critical assessment of their own program, processes and performance would have provided opportunities for performance improvement.

The Nuclear Oversight Board (NOB) had previously noted: "NOD's failure to take a critical look at it's own programs, process and performance that may have contributed to the site's ineffective oversight of Holtec, which resulted in the August 2018 download event." The ACE team agrees with the NOB comment; therefore, the corrective plan contains actions to perform industry benchmarking and self-assessments for the purpose of continuous learning and improvement of NOD performance.

Contributing Cause No. 1: Inadequate Program Monitoring
The NOD did not conduct effective self-critical and objective assessments of NOD programs, processes and performance.

From NOD Assessment NODB 742 - based on interviews with NOD personnel (in part) March 2018 - August 2018: "There are NOD independence and effectiveness challenges. NOD is not providing effective oversight of Holtec FTO. One individual from NOD is assigned to oversight of FTO, and that person is also used to support other NOD activities, such as audits. NOD personnel are directed by NOD management to not conduct oversight of Holtec FTO but instead are directed to evaluate the performance of the DA oversight organization in their role of overseeing FTO. This arrangement does not meet the DQAP regarding NOD responsibility to assure quality activities at SONGS are performed in accordance with implementing procedures." "NOD assessments performed between March and August 2018 reflect very little oversight of Holtec. FTO observed by NOD are primarily limited to Holtec dry run testing. The bulk of NOD assessments during this period address contractor corrective action program implementation and canister foreign material inspections."

The next phase of the causal analysis addresses issues associated with the use of personnel resources. NOD's only regulatory commitment is the performance of internal audits under 10CFR50, Appendix B. As such, the heavy audit schedule starting in early 2018 made it necessary to reassign the three (3) SCE auditors to full-time audit performance, with the need to frequently call upon the contracted auditor to lead and support audit teams. This condition resulted in inadequate NOD support of Holtec FTO oversight. An interviewee noted that the NOD group was "barely keeping their heads above water" at the time. Another interviewee noted his involvement in Holtec oversight was part time, at best. The lack of NOD presence was apparently not viewed upon as a problem by NOD management; it appears that there was an overreliance on the integrated/holistic oversight approach and assumptions that the other integrated/holistic oversight constituents would provide sufficient oversight in NOD's absence.

The issue related to whether there were ~~a~~ sufficient number of personnel resources, the NOD personnel interviewed were of the belief that there were not a sufficient number of auditors/assessors. However, the utilization and allocation of resources should also be addressed (e.g., were the various NOD activities adequately pre-scheduled, the appropriate level of personnel support allocated, and activities appropriately focused as to maximize the review of critical performance areas and minimize the time spent on low valve administrative issues). The NOD group appears to be process driven, overly focused on resource depleting audits and administrative issues, versus results driven. The corrective action plan has multiple actions which are designed to strengthen the NOD. [Ref. CA Matrix]

<u>Contributing Cause No. 2</u>: Utilization and Allocation of Resources
There were insufficient resources in the form of personnel and quality procedures[1] available to provide a sufficient level of oversight of Holtec field activities.

During the period of the event precursors (January to August 2018), NOD did not have a group supervisor or designated group lead. Instead, the NOD group reported directly to a manager who was wearing multiple hats (Plant Licensing, NOD and the Employee Concerns Program) at the time. The plant licensing activities distracted the NRA/NOD/NSC manager from engaging adequately with the NOD staff. Interviews conducted with NOD and ECP personal indicated there was minimal management presence to provide overall guidance, coaching and mentoring. As an interviewee noted, the manager made no point of coming to see us as he was too busy with non-QA activities.

[1] The Barrier Analysis conducted as part of this ACE identified weakness in some NOD related procedures. These procedure deficiencies are addressed in the corrective action plan.

The potential for conflict of interest was recognized by the Nuclear Oversight Board. Action Request 1217-37478 was created documenting the following problem description (in part): "NOB Assessment Item: Assess collateral duties assigned to the Regulatory Affairs Manager. The San Onofre Nuclear Oversight Board (NOB) met on site the week of September 18, 2017 and issued a report documenting the findings of their visit. Items identified in the report which need further evaluation are listed as Executive Summary Items (ESI). There are, however; some items contained in the report that are not ESI but also warrant further evaluation. As part of the assessment of Nuclear Oversight, the NOB identified a concern regarding the independence of the Manager responsible for the Nuclear Oversight Division (NOD). That issue is listed as follows: NOD reports to the Regulatory Affairs Manager as Regulatory Affairs is organizationally independent of production responsibilities. However, collateral duties assigned to the Regulatory Affairs Manager (e.g., Fuel Transfer Crane Recovery) are sufficiently tied to production; the site should consider formally recusing the Regulatory Affairs Manager from NOD issues related to the cranes until the collateral duty is completed."

Assignment 1217-37478-1 was created, evaluated and closed with the following text: "Agree with the NOB concern- ensuring the impartiality of the leadership over NOD is important to maintain the perceived functioning and actual functioning of that position. To that end, with agreement of the CNO, the Manager, Regulatory and Oversight, if put in a position where production and oversight intersect, will abdicate his responsibility to the CNO, or his designee, so that they can make the decisions that impact the Oversight function. Indeed, during the Cask Crane recover process, the was a need for NOD to receipt inspect the newly purchased crane rope. The Manager, Regulatory and Oversight, alerted the CNO that if there were decisions relative to the ropes acceptability, that the CNO would be asked to step in to prevent the appearance of impropriety. In this example, there was no need for the CNO to step in, because there were no inspection deficiencies that required intervention or decisions (other than to follow the receipt process, i.e. no grey areas encountered). But the example shows that the Manager, and NOD team are mindful of such circumstances, and there is a working method to prevent them from being problematic to proper Oversight."

An example of another potential conflict of interest was the inappropriate action related to the decision not to report the August 3, 2018 downloading event to the NRC. The NRA/NOD/ECP Manager was wearing multiple hats at the time; he was part of the decision resulting in the late reporting of MPC Serial #67.

In May of 2019, RCE 0419-27809, *Evaluation of NOD and DA Oversight of Fuel Transfer Operations and Decommissioning Activities* was conducted and identified the need for an independent NOD Manager. As a result, a new NOD Manager was on-boarded on June 24, 2019. (Ref. Assignment 0419-27809-07)

Apparent Cause No. 1: No Dedicated and Independent NOD Manager
The NOD Manager was not dedicated and independent. The Manager of NRA/NOD/NSC was holding multiple positions at the same time, and significantly involved in NRA actions. There were competing priorities and conflicts of interest that impacted effective management of the NOD in the areas of field presence, program monitoring, and the utilization and allocation of resources.

Barrier Analysis Summary:
As the secondary cause analysis tool, the Barrier Analysis identified seven (7) barriers that were found to be ineffective, weak or missing. as noted below:

- Resources (Personnel): The assignment of sufficient numbers of NOD personnel to perform FTO oversight was a ***Weak*** barrier because such resources were primarily limited to one part-time NOD person between March and August 2018. Post event, NOD assigned additional personnel to field activities.

- Resources (Procedures): Robust NOD assessment procedures were a ***Missing*** barrier because NOD assessment procedure SO123-XII-2 (Assessment Program) was not issued until July 2019.

- Action Request: NOD Action Request initiation for FTO-related problems was a ***Weak*** barrier because NOD management requested that NOD personnel allow the line to initiate action requests for FTO-related quality problems. NOD now writes their own ARs for their identified issues.

- Station Management: Station management was an ***Ineffective*** barrier because FTO/Holtec fixed cost contractual obligations emphasize schedule completion over compliance and quality, challenging FTO in-field priorities. Interviews with NOD personnel and prior causal analysis (AR 0818-20356) indicate less than adequate management field presence during the period of the downloading event. This resulted in less than adequate management field presence during the period of the downloading event. The Management Observations have significantly improved since the event, and are currently effective tools to monitor field performance.

- NOD Management: NOD management was an ***Ineffective*** barrier, failing to recognize that integrated oversight conflicts with regulatory and license requirements. This was corrected with the addition of the new dedicated and independent NOD manager.

- DA Management: DA Management oversight of CAP implementation was an ***Ineffective*** barrier because DA management allowed problems corrected on the spot in the field did not need an Action Request. This was corrected under ACE 0120-29302 and the corrective action set.

- Procedure SO123-XII-5.6 was an ***Ineffective*** barrier because the NOD did not recognize the applicability of SO123-XII-5.6 to Holtec FTO procedures and, therefore, did not perform such reviews prior to procedure use by Holtec. (AR 1219-19396)

- Procedure SO123-XII-1.3 is a ***Weak*** barrier because SO123-XII-1.3 does not clearly establish NOD authorities and duties and does not assure full station support of NOD at the highest level of management.

The barrier analysis performance deficiencies have been captured in the corrective action plan.

OPERATING EXPERIENCE

The August 03, 2018, Holtec FTO downloading event at SONGS, and the precursor events leading up to the event, resulted in multiple cause evaluations as noted in the Sequence of Events. These cause analysis products have been discussed in various cause evaluations as internal operating experience. For this reason, the ACE Team elected to conduct a review of external Operating Experience for other licensees that may have experienced some level ineffective oversight. The following Column 4 Fundamental Root Cause Evaluation was identified as providing potential learning for the ACE Team:

- Entergy Root Cause Evaluation: CR-ANO-C-2015-2836, Corporate and Independent Oversight

In March of 2015, the NRC placed Arkansas Nuclear One (ANO) in Column IV of the Reactor Oversight Process (ROP), because of issues associated with a rigging event (stator drop) and a subsequent flooding finding. As part of their Column IV recovery effort, ANO performed several fundamental root cause evaluations; one of the evaluations was associated with Corporate and Independent Oversight. The ANO root cause team developed the following problem statement: "Oversight of ANO performance by corporate and independent organizations did not serve as an effective barrier to prevent a significant decline in ANO safety performance over an extended period of time."

The ANO root cause team identified two (2) root caused and one contributing cause. The SONGS ACE team found the following ANO contributing cause to be of interest due to the commonalities to the SONGS event condition under evaluation:

> *"ANO leaders have not maintained a strong continuous learning culture. This Contributing Cause contributed to the condition by insufficient alignment of priorities, proper delegation of responsibilities, effective communication, and follow up of action resolutions identified by corporate and independent oversight, NRC, and INPO. This cause allowed a significant decline in ANO safety performance."*

The key takeaway for the SONGS ACE team is the importance that continuous learning plays in ensuing the safe performance of the plant. NOD must conduct effective and self-critical assessments of their program and perform periodic benchmarking of known industry best performers, that are at or near the same schedule of decommissioning as SONGS. See the Corrective Action Matrix for SONGS actions to support continuous learning.

RISK SIGNIFICANCE

The station was at a high risk to an event of nuclear safety, radiological safety, and regulatory compliance consequence preceding the August 3, 2018, MPC Serial #67 downloading event. Following the event, Fuel Transfer Operation (FTO) was halted pending the understanding of causes and implementation of corrective actions as to reduce the risk of another significant event. Holtec performed Root Cause Analysis QI 2529 (The MPC Downloading Incident at SONGS) and SCE performed ACE AR 0818-20356 (Assessment of SCE Oversight Effectiveness during MPC #67 Downloading Event). Implementation of resultant corrective actions, along with additional actions, supported resumption of FTO based on a low risk of another event of significant consequence.

In April 2019, Plant management developed a concern for the effectiveness of the overall quality assurance oversight process at SONGS, and AR RCE 0419-27809 (Evaluation of NOD and DA

Oversight of Fuel Transfer Operations and Decommissioning Activities) was generated to further understand oversight performance. The corrective action set resulted in implementation of an extensive set of actions in the areas of NOD and DAO performance, further reducing the risk to an event of significant consequence. Currently, the station remains at a low risk to an event of significant consequence.

This ACE 1219-54559 supplements RCE 0419-27809 in the area of NOD performance. The purpose is to identify any remaining gaps in performance and implement corrective actions to close gaps.

CORRECTIVE ACTION MATRIX

ACE Element	Description of Action	Tracking Information
Problem: *The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to events of significance.*	Note: This corrective action plan is essentially a "suite" of actions designed to resolve the condition (Problem). No separate action is required to address the condition.	N/A
Direct Cause **DC-1**: Insufficient NOD Field Presence	Note: This corrective action plan is essentially a "suite" of actions designed to resolve the condition (Problem); the suite of actions also addresses Direct Cause No. 1. No separate action is required to address DC-1.	N/A
Extent of Condition	None	N/A
Apparent Cause **AC-1:** No Dedicated and Independent Manager	**CA-1: Hire a New Manager of Nuclear Oversight** Hire an independent QA Manager to lead the Nuclear Oversight organization. *The intent of this corrective action was to hire a new manager of the Nuclear Oversight Division, to provide independence.*	AR/Assignment: 0419-27809-10 Owner: Al Bates Completed on Date: 07/10/2019
Contributing Cause **CC-1:** Inadequate Program Monitoring	**CA-2: Develop / Execute NOD Self-Assessment Plan** Develop and execute a plan for NOD to conduct periodic self-assessments of NOD programs, processes and performance. The conduct of this ACE under evaluation satisfies the initial assessment of NOD performance. Periodicity of the future assessments to be determined by the NOD Manager. *The intent of this corrective action is to conduct NOD self-assessments for performance monitoring and learning purposes.*	AR/Assignment: 1219-54559-2 Owner: Jim Madigan Due Date: August 31, 2020

Contributing Cause **CC-1:** Inadequate Program Monitoring	**CA-3: Establish / Implement Missed-Opportunity Procedure** Establish / Implement Miss-Opportunity Procedure to include: • Performance of a review after each significant event • Periodic reviews to capture learning of lessor events • A response to should / could NOD have prevented events? • If yes, action planned or taken to improve performance. *The intent of this action is to provide NOD with a tool formalize and address missed opportunities.*	AR/Assignment: 1219-54559-3 (For Documenting in SCE CAP) Owner: Jim Madigan Due Date: August 31, 2020
Contributing Cause **CC-2:**Utilization and Allocation of Resources	**CA-4: Augment NOD Staffing** Augment the base SCE NOD staff with qualified and experienced contractor personnel. Three (3) qualified and experienced assessors and auditors were hired, who each brought field experience in decommissioning related activities. *The intent of this action was to add contract NOD personnel to the existing SCE NOD staff. The action was completed outside of CAP, so this action is for documenting the addition of the contract staff.*	AR/Assignment: 1219-54559-4 (For Documenting in SCE CAP) Owner: Jim Madigan Due Date: August 31, 2020
Contributing Cause **CC-2:** Utilization and Allocation of Resources	**CA-5: Develop / Execute NOD Scheduling Tool** Develop and execute a Bi-Weekly NOD resource loading schedule, based on risk, which integrates field observation activities with mandated assessments. *The intent of this action is to provide the NOD Manager with a tool to assist in the prioritization, utilization and allocation of NOD resources.*	AR/Assignment: 1219-54559-5 Owner: Jim Madigan Due Date: August 31, 2020
Contributing Cause **CC-2:** Utilization and Allocation of Resources	**CA-6: Strengthen NOD for Post-FTO Oversight Activities** Conduct formal benchmarking of a decommissioning facility(ies) recognized for high performance in the area of independent oversight. The Benchmarking Plan to be approved by the NOD Manager prior to execution of the plan. As a minimum, the benchmarking should explore potential new strategies for: • Structure/Priorities (Mental Model)	AR/Assignment: 1219-54559-6 Owner: Jim Madigan Due Date: September 30, 2020

	• Resources (Utilization and Allocation of Personnel) • Resources (Procedures) • Vision (Process or Results Driven) • Critical Self-Assessments (Program Monitoring) Upon completion of the benchmarking effort above, analyze the information gleaned from the benchmarking effort and implement a plan to incorporate the identified industry best practices. Implementation of the plan to include revising the effected documents identified in the plan, as necessary. *The intent of this corrective action is to develop and implement a Nuclear Oversight Division model for Post-FTO Independent Oversight activities.*	
Contributing Cause **CC-2:** Utilization and Allocation of Resources	**CA-7: Procedure Revision to Close Gaps** Revise Procedure SO123-XII-1.3 (Authorities and Duties of Nuclear Oversight Division Personnel) to close the gaps identified in the Barrier Analysis of this evaluation. (See Attachment 3 of this report for the identified gaps.) *The intent of this corrective action is to close the procedure gaps that were identified while performing the Barrier Analysis.*	AR/Assignment: 1219-54559-7 Owner: Jim Madigan Due Date: August 31, 2020
Betterment Action	**OA-1: Procedure Enhancement** Perform a comprehensive review of procedure SO123-XII-5.6 (Review/Approval of Procedures and Instructions) to ensure that the requirements for NOD review of Holtec FTO procedures is clearly communicated. Revise procedure SO123-XII-5.6 if gaps are identified during the review. *The intent of this betterment action is to ensure clarity of the requirements for NOD review of Holtec FTO procedures.*	AR/Assignment: 1219-54559-8 Owner: Jim Madigan Due Date: August 31, 2020

CONTACTS and REFERENCES

References and Documents Reviewed

- Decommissioning Quality Assurance Program (DQAP)
- 10CFR50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- NOD Assessment Report No. NOBD 742 (Observation Period: 03/2018 – 08/208)
- NOD Assessment Report No. NOBD 742 (Observation Dates: 12/2/2019 – 12/19/2019)
- Nuclear Oversight Board (NOB) Report from First Quarter 2020 Plant Visit
- Action Request No. 0419-35707, Documented Various Hang-Ups During Downloading
- Action Request No. 1217-37478, NOB Concern Over NOD Manager Independence
- Action Request No. 0818-76588 (Significance Level 1), Track Vendor Root Cause Evaluation on the Holtec Downloading Event
- Action Request No. 1219-38896, Consider a “Missed Opportunity” Procedure for NOD
- Action Request No. 1219-54559
- Root Cause Analysis No. QI 2529, The MPC Downloading Incident at SONGS
- Root Cause Evaluation No. 1218-33805, SONGS Failure to Report a Loss of Function to the Nuclear Regulatory Commission Within the Prescribed Timeframe
- Root Cause Evaluation No. 0419-27809, Evaluation of NOD and DA Oversight of Fuel Transfer Operations and Decommissioning Activities
- Apparent Cause Evaluation No. 0118-14935, Seismic Stop Modification Performed without Sufficient Technical Justification or the Required 72.48/50.59 Review
- Apparent Cause Evaluation No. 0818-20356, ACE to Assess SCE Oversight Effectiveness During the August 03, 2018 Download of MPC #67 Into VVM #022
- Apparent Cause Evaluation No. 1218-59856, Spent Fuel Canisters (HI-PORT Loaded with HI-TRAC) Transported Outside Seismic Analysis Assumptions
- Apparent Cause Evaluation No. 1219-22465, Vertical Cask Transporter Operated Outside Seismic Analysis Assumptions
- Apparent Cause Evaluation No. 1218-81167, Evaluation of Unit 1 RPV Strap Removal
- Apparent Cause Evaluation No. 1219-52380, Load Indicating Shackles Not Tested per Purchase Specification
- Apparent Cause evaluation No. 0120-29302, CAP Procedure is Non-Compliant with Regulations and DQAP
- Common Cause Evaluation No. 203285542, Ineffective Contractor Control
- Protected Area Entry / Exit Data
- ISFSI Area Entry / Exit Data
- SO123-XII-1.3, Authorities and Duties of Nuclear Oversight Personnel; Revision 20
- SO123-XV-50, Corrective Action Program; Revision
- SO123-XII-18.1, Audit Program Implementation
- SO123-XI-2, Assessment Program
- SO123-XV-93, Contractor Oversight
- G-XV93-24, Rev. 1, DA Expectations for Nuclear Industry Oversight Function
- 2020 SONGS Oversight Organizational Interface and Communication Protocol Document
- Entergy Nuclear Management Manual EN-QV-100, Conduct of Nuclear Independent Oversight (NIOS), Revision 13

- Entergy Root Cause Evaluation No. CR-ANO-C-2015-2836, Corporate and Independent Oversight
- NRC NUREG-2165, Safety Culture Common Language
- NRC Inspection Manual, Manual Chapter 0310, Aspects Within the Cross-Cutting Areas

Personnel Contacted and Interviewees

- Clark Vanderniet, Nuclear Oversight Specialist
- Brad Churchill, SCE Lead Auditor-Nuclear Oversight Division
- Manny Alvarado, SCE Employee Concerns Program

ACE Team Members

- James Madigan, Manager-Nuclear Oversight and Safety Culture
- David Karr, Nuclear Oversight Division – Decommissioning Auditor
- Greg Hudnall, Manager – Nuclear Oversight Division, Entergy - Arkansas Nuclear One
- Roland LaBeaf, SCE Employee Concerns Program

ATTACHMENTS

Attachment 1: Extent of Condition Worksheet
Attachment 2: Event & Causal Factors Charting Analysis
Attachment 3: Barrier Analysis

ATTACHMENT 1: EXTENT OF CONDITION WORKSHEET

The intent of this Extent of Condition analysis is to identify where else the same, or similar, conditions are in existence, but adverse impact has not yet occurred at SONGS. The scope of this Extent of Condition is directly related to the Problem Statement of this ACE. For ease of reading, the Problem Statement is repeated below:

> *The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to events of significance. This condition resulted in increased Fuel Transfer Operations (FTO) and Decommissioning Project risks, and in regulatory and financial impacts.*

The team convened to discuss potential similar objects and defects. The ACE Team determined that for this Extent of Condition, the Object would be expanded to include "Other Station Oversight Organizations" and the Deviation was modified to "Was ineffective at identifying precursors to events of significance other than FTO."

The extent of condition is based on both quantitative data and qualitative judgment by the ACE Team using the relative frequency and consequences of same/different conditions. The below matrix was used to determine the need for "action required," "provide basis" or "no action required" based on risk (frequency and consequences).

Frequency/Probability of Occurrence	***Potential Consequences***		
	High	***Medium***	***Low***
High	*Correct*	*Correct*	*Provide Basis*
Medium	*Correct*	*Provide Basis*	*No Action*
Low	*Correct*	*Provide Basis*	*No Action*

The SONGS CAP Manual and associated ACE template has expectations to evaluate the *Same-Same, Same-Similar and Similar-Same* Extent of Condition tiers for apparent cause level evaluations. However, since the event under evaluation involved significant regulatory and financial impacts, the cause evaluation team conservatively elected to evaluate all the Extent of Condition tiers by including the *Similar-Similar* tier.

The extent of condition table below summarizes the review and additional detail is provided following the table.

Extent of Condition Table:

Condition Statement:	The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to Holtec Fuel Transfer Operations (FTO) events of significance. This condition resulted in increased FTO and Decommissioning Project risks, and in regulatory and financial impacts.		
Object:	The San Onofre Nuclear Oversight Division (NOD)	**Deviation:**	Was ineffective at identifying precursors to Holtec FTO events of significance.
EOCo Tier	**Object**	**Deviation**	**Comments**

Same-Same	The San Onofre Nuclear Oversight Division (NOD)	Ineffective at identifying precursors to Holtec FTO events of significance.	Low Risk (Low Probability / High Consequence) This is the subject of the ACE. Corrective actions to be developed based on the identification of causes. See Corrective Action Matrix.
Similar-Same	Other Station Oversight Organizations	Ineffective at identifying precursors to Holtec FTO events of significance.	Low Risk (Low Probability / High Consequence) Action Taken: Currently, other than the oversight provided by NOD, other oversight of Holtec FTO is performed by DA Oversight Specialists and the Contract Technical Representatives (CTRs). As with NOD, the current performance is at an acceptable level of performance. Therefore, there is no immediate concerns for the performance of the CTRs and DA Oversight Specialists.
Same-Similar	The San Onofre Nuclear Oversight Division (NOD)	Ineffective at identifying precursors to events of significance other than Holtec FTO (e.g., other major contractors on site that may perform quality affecting work). .	High Risk (Low Probability / High Consequence) Action Taken: Currently, SONGS Decommissioning Solutions (SDS) the primary decommissioning contractor at SONGS and their Quality Assurance is performing at an acceptable level. No additional actions required.

Extent of Condition Summary:

Same-Same Tier:
Question: Does the potential currently exist for the San Onofre Nuclear Oversight Division to be ineffective at identifying precursors to Holtec FTO events of significance.
Response: Yes

Analysis of the *Same-Same* Tier: This tier is the subject of the ACE. Corrective actions to be developed based on the identification of causes. See Corrective Action Matrix.

***Similar-Same Tier*:**
Question: Does the potential exist for other Station Oversight Organizations to be ineffective at identifying precursors to Holtec FTO events of significance.
Response: Yes, but the risk is low.

Analysis of the *Similar-Same* Tier: This tier is related to the potential that other Station Oversight Organizations (other than NOD) to be ineffective at identifying precursors to Holtec FTO events of significance. Currently, other than the oversight provided by NOD, other oversight of Holtec FTO is performed by DA Oversight Specialists and the Contract Technical Representatives (CTRs). As with NOD, the current performance is at an acceptable level of performance. Therefore, there is no immediate concerns for the performance of the CTRs and DA Oversight Specialists. Actions already taken by the DA Oversight organization address this condition and no further actions are recommended at this time.

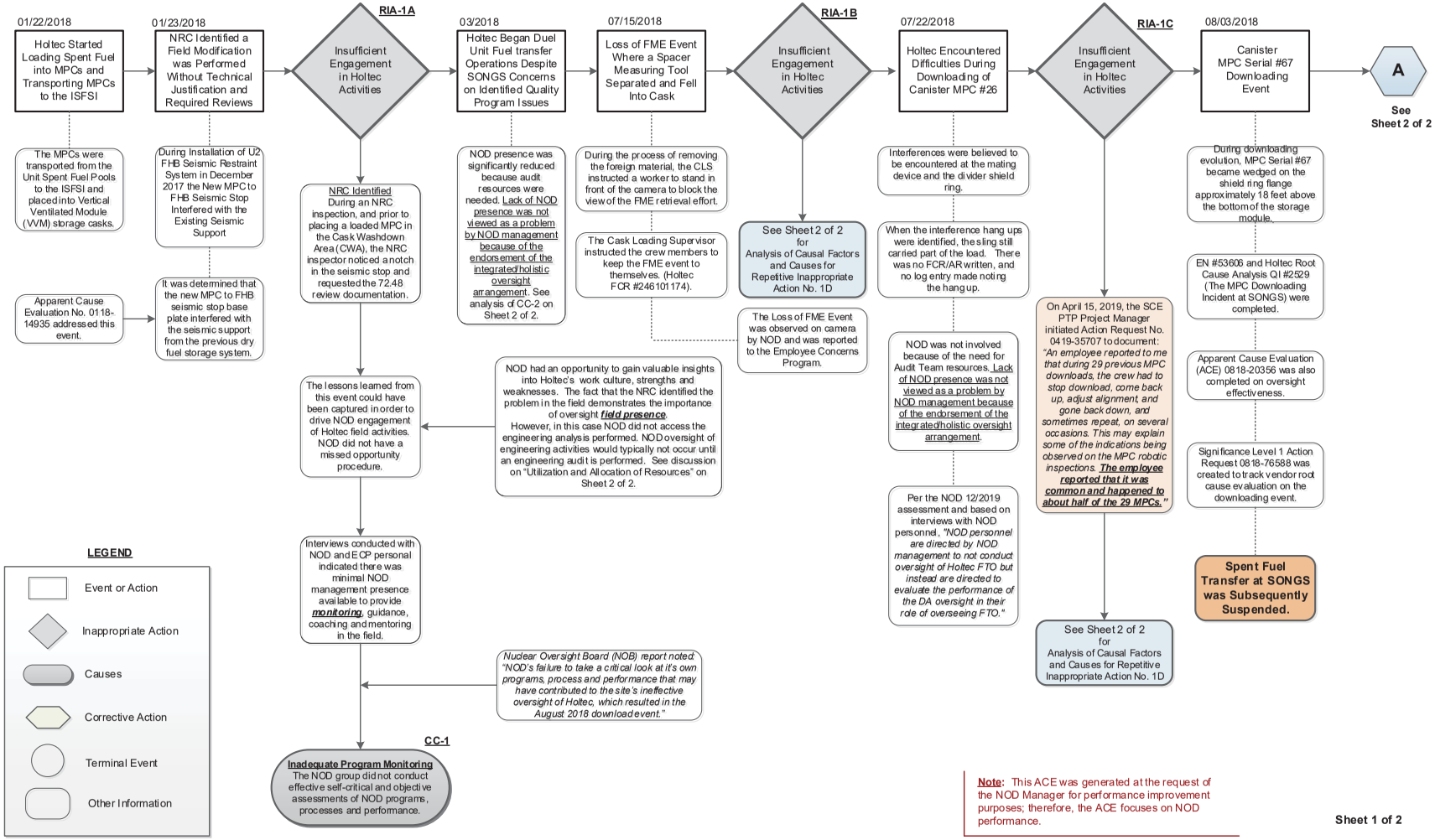
***Same-Similar Tier*:**
Question: Does the potential currently exist for the San Onofre Nuclear Oversight Division to be ineffective at identifying precursors to events of significance other than Holtec FTO (e.g., other major contractors on site that may perform quality affecting work).
Response: Yes, but the risk is low.

Analysis of the *Same-Similar* Tier: This tier is related to the potential for NOD to be ineffective at identifying precursors to events of significance other than Holtec FTO. Currently, SONGS Decommissioning Solutions (SDS) the primary decommissioning contractor at SONGS and their Quality Assurance is performing at an acceptable level. No additional actions required.

ATTACHMENT 2: EVENT & CAUSAL FACTORS CHARTING ANALYSIS

Event & Causal Factors Chart
Action Request No. 1219-54559

Sequence of Events:



Note: This ACE was generated at the request of the NOD Manager for performance improvement purposes; therefore, the ACE focuses on NOD performance.

Sheet 1 of 2

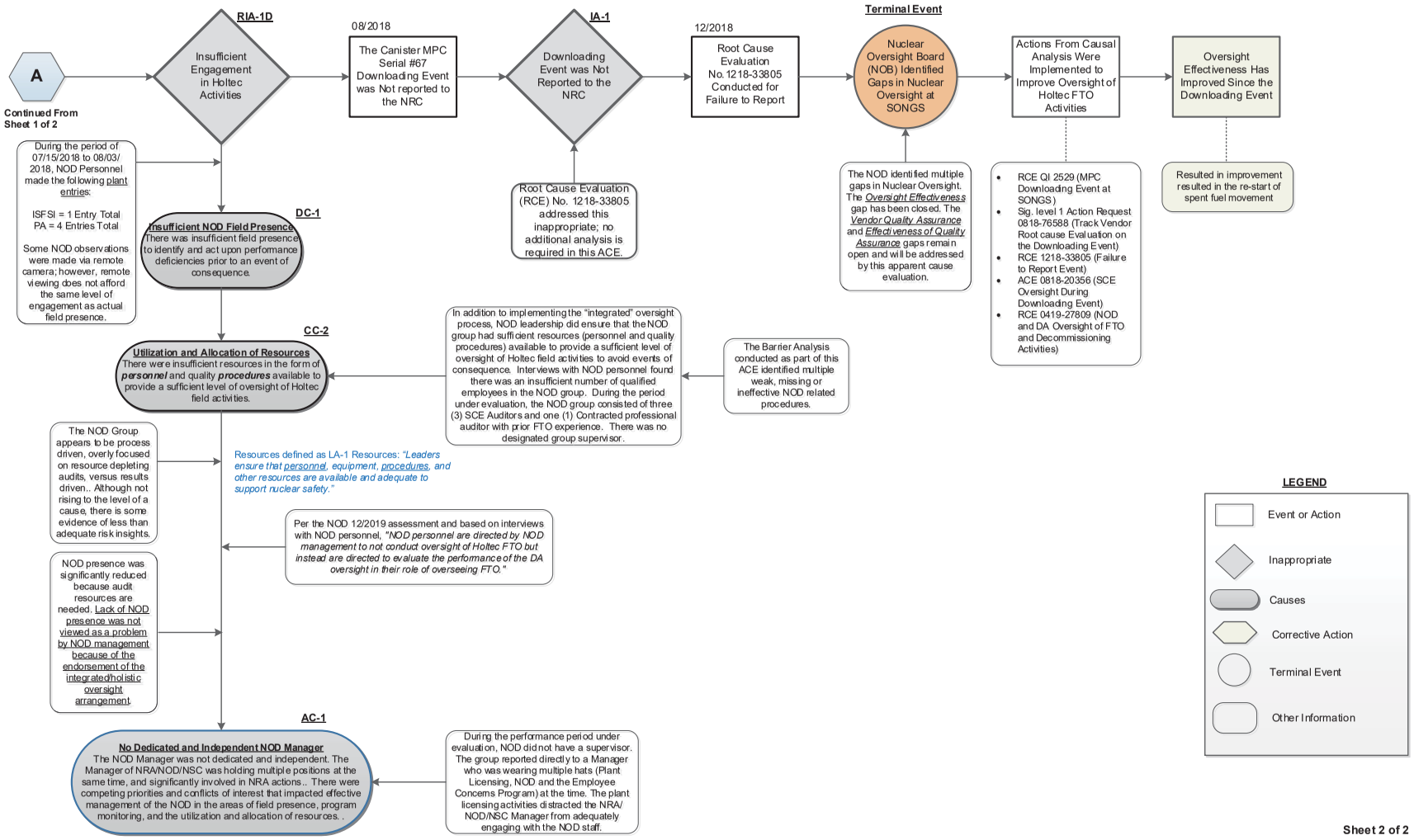
Apparent Cause Evaluation

Revision 0, Effective 08/20/2019

Event & Causal Factors Chart

Action Request No. 1219-54559

Sequence of Events:



Sheet 2 of 2

Revision "F" - June 23, 2020

ATTACHMENT 3: BARRIER ANALYSIS

Consequences State Adverse Impact(s)	**Barriers** List Physical and Administrative Barriers	**Barrier Assessment** State Missing, Weak or Ineffective; and Why
The San Onofre Nuclear Oversight Division (NOD) was ineffective at identifying precursors to events of significance.	1. 10CFR50, Appendix B and the DQAP require that NOD maintain independence from cost and schedule and have sufficient organizational freedom and authority to identify problems and assure resolution of those problems. 2. Resources (Personnel): The assignment of sufficient numbers of qualified NOD personnel to perform FTO oversight. 3. Resources (Procedures): Robust NOD assessment procedures, driving intrusive and in-depth independent oversight. 4. Action Request: NOD action request initiation for FTO-related quality problems.	1. 10CFR50, Appendix B and the DQAP were ***Effective*** barriers; however, SONGS management made the decision to implement a non-compliant "integrated" oversight approach, challenging compliance and reducing NOD independence, organizational freedom and authority. 2. The assignment of sufficient numbers of qualified NOD personnel to perform FTO oversight was a ***Weak*** barrier because such resources were primarily limited to one part-time NOD person between March and August 2018. 3. Robust NOD assessment procedures were a ***Missing*** barrier because NOD assessment procedure SO123-XII-2 was not issued until July 2019. 4. NOD action request initiation for FTO-related problems was a ***Weak*** barrier because NOD management requested that NOD personnel allow the line to initiate action requests for FTO-related quality problems, resulting in less than adequate results.
The establishment and implementation of an "integrated" oversight approach is non-compliant with 10CFR50, Appendix B and the DQAP.	1) Station Management: Prioritizes regulatory and license compliance and quality over project management and production, effectively monitoring Holtec and FTO performance and maintaining full awareness of all project activities, including the oversight function.	1) Station management was an ***Ineffective*** barrier because FTO/Holtec fixed cost contractual obligations emphasize schedule completion over compliance and quality, challenging FTO in-field priorities. Interviews with NOD personnel and prior causal analysis (AR 0818-20356) indicate less than adequate management field presence during the period of the downloading event.

Consequences State Adverse Impact(s)	**Barriers** List Physical and Administrative Barriers	**Barrier Assessment** State Missing, Weak or Ineffective; and Why
	2) NOD Management: Recognizes 10CFR50, Appendix B and DQAP requirements for quality assurance independence and authority to identify quality problems, including sufficient independence from cost and schedule.	2) NOD management was an ***Ineffective*** barrier, failing to recognize that integrated oversight creates challenges with respect to regulatory and license compliance. The NOD manager in place at the time of the downloading event was the motivation for integrated, i.e. "holistic" (in the words of the NOD manager) oversight. The integrated approach aligns NOD with the line oversight function, i.e. DAO and significantly reduces NOD independence, organizational freedom, and authority to identify quality problems and verify the adequacy of corrective actions.
Precursor events to the August 2018 fuel canister downloading incident went unrecognized by station management. As a result, corrective actions were not implemented to prevent a more significant downloading event.	1. The DQAP, Section 16.0 requires that conditions adverse to quality (CAQs) be resolved using CAP and that CAQs be analyzed to identify trends. 2. Procedure SO123-XV-50, Corrective Action Program contains a low threshold for action request initiation, defines a CAQ, and requires trending of CAQs. 3. DA Management: Responsible for in-process oversight of CAP implementation, as applicable to FTO.	1. As a stand-alone license document, the DQAP was considered an ***Effective*** barrier in assuring that CAQs are resolved using CAP. 2. SO123-XV-50, Rev. 41 (in place in August 2018) was an ***Effective*** barrier because SO123-XV-50 defines a CAQ and establishes a low threshold for action request initiation. 3. DA Management oversight of CAP implementation was an ***Ineffective*** barrier because DA management responsible for CAP believed that problems resolved in the field need not be documented in an action request, thereby circumventing CAP and formal corrective actions and the opportunity to trend CAQs.

Consequences State Adverse Impact(s)	**Barriers** List Physical and Administrative Barriers	**Barrier Assessment** State Missing, Weak or Ineffective; and Why
Holtec FTO procedures were not reviewed by NOD for compliance with the DQAP and 10CFR50, Appendix B.	Procedure SO123-XII-5.6, Review and Approval of Procedures and Instructions requires that NOD identify procedures requiring review and then perform such reviews.	Procedure SO123-XII-5.6 was an ***Ineffective*** barrier because the NOD did not to recognize the applicability of SO123-XII-5.6 to Holtec FTO procedures and, therefore, did not perform such reviews prior to procedure use by Holtec. (AR 1219-19396)
The authorities and duties of NOD personnel are not clearly established or fully understood, resulting in incomplete and inconsistent implementation of license and regulatory QA commitments and uncertainties as to the authorities of NOD individual contributors and NOD management.	Procedure SO123-XII-1.3, Authorities and Duties of Nuclear Oversight Personnel.	Procedure SO123-XII-1.3 is a ***Weak*** barrier because SO123-XII-1.3 does not clearly establish NOD authorities and duties and does not to assure full station support of NOD at the highest level of management: • SO123-XII-1.3 does not establish overriding NOD priorities to guide the conduct of all NOD activities. • SO123-XII-1.3 does not establish the NOD Vision and Mission to guide NOD and provide linkage to priorities and focus areas. • SO123-XII-1.3 does not establish CNO responsibilities for assuring that oversight activities are conducted in compliance with administrative and regulatory requirements and that sufficient resources are available to NOD to effectively perform their function. • SO123-XII-1.3 does not establish requirements that NOD maintains independence from the station culture and activities and is not unduly influenced by cost and schedule pressures. • SO123-XII-1.3 does not establish expectations for the performance of intrusive and critical oversight activities and the use of questioning attitude. • SO123-XII-1.3 does not establish expectations for NOD monitoring of station safety culture and safety conscious work environment.

Summary of Barrier Analysis:

As the secondary analysis tool, the Barrier Analysis evaluated ten (10 barriers. The analysis identified four (4) ineffective barriers, two (2) weak barriers and one (1) missing barrier, as noted below:

- Resources (Personnel): The assignment of sufficient numbers of NOD personnel to perform FTO oversight was a ***Weak*** barrier because such resources were primarily limited to one part-time NOD person between March and August 2018. Post event, NOD assigned additional personnel to field activities.

- Resources (Procedures): Robust NOD assessment procedures were a ***Missing*** barrier because NOD assessment procedure SO123-XII-2 (Assessment Program) was not issued until July 2019.

- Action Request: NOD Action Request initiation for FTO-related problems was a ***Weak*** barrier because NOD management requested that NOD personnel allow the line to initiate action requests for FTO-related quality problems. NOD now write their own ARs for their identified issues.

- Station Management: Station management was an ***Ineffective*** barrier because FTO/Holtec fixed cost contractual obligations emphasize schedule completion over compliance and quality, challenging FTO in-field priorities. Interviews with NOD personnel and prior causal analysis (AR 0818-20356) indicate less than adequate management field presence during the period of the downloading event. This resulted in less than adequate management field presence during the period of the downloading event. The management Observations have significantly improved since the event, and are currently an effective tool to monitor field performance.

- NOD Management: NOD management was an ***Ineffective*** barrier, failing to recognize that integrated oversight conflicts with regulatory and license requirements. This was corrected with the addition of the new dedicated and independent manager.

- DA Management: DA Management oversight of CAP implementation was an ***Ineffective*** barrier because DA management allowed problems corrected on the spot in the field did not need an Action Request. This was corrected under ACE 0120-29302 and the corrective action set.

- Procedure SO123-XII-5.6 was an ***Ineffective*** barrier because the NOD did not to recognize the applicability of SO123-XII-5.6 to Holtec FTO procedures and therefore did not perform such reviews prior to procedure use by Holtec. (AR 1219-19396)

- Procedure SO123-XII-1.3 is a ***Weak*** barrier because SO123-XII-1.3 does not clearly establish NOD authorities and duties and does not assure full station support of NOD at the highest level of management.

The barrier analysis performance deficiencies have been captured in the corrective action plan.

ATTACHMENT B:

Revised NRC Special Inspection Report

050-00206/2018-005, 050-00361/2018-005,

050-00362/2018-005, 072-00041/2018-001

and Revised Notice of Violation

December 19, 2018

REVISED

SAN ONOFRE NUCLEAR GENERATING STATION
NRC SPECIAL INSPECTION REPORT 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001 AND REVISED NOTICE OF VIOLATION (ML18341A172)

Enclosure

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

December 19, 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: REVISED NRC SPECIAL INSPECTION REPORT 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001 AND REVISED 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) assure that operations of important to safety equipment were limited to trained and certified personnel or under direct supervision; 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.: NPF-10; NPF-15; DPR-13

Enclosures:
1. Notice of Violation
2. Revised NRC Special Inspection Report 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, and 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.: NPF-10; NPF-15; DPR-13
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 72.190 requires, in part, that the operation of equipment and controls that have been identified as important to safety in the Safety Analysis Report and in the license must be limited to trained and certified personnel or be under the direct supervision of an individual with training and certification in the operation. The HI-STORM UMAX SYSTEM Final Safety Analysis Report (FSAR), Revision 4, dated August 14, 2017, specifies, in part, that the operations at the independent spent fuel storage installation are governed by the HI-STORM FW SYSTEM FSAR, Revision 5, dated June 20, 2017, which specifies that the multipurpose canister lifting slings and multipurpose canister lift attachments are designated as important to safety equipment.

Contrary to the above, from January 30 to August 3, 2018, the licensee failed to assure that operations of equipment and controls that had been identified as important to safety in the Safety Analysis Report were limited to trained and certified personnel or were under the direct supervision of an individual with training and certification in the operation. 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, TX 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 19th day of December 2018

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-206; 50-361; 50-362; 72-041
License Nos.:	NPF-10; NPF-15; DPR-13
Report No.:	050-00206/2018005; 050-00361/2018005; 050-00362/2018005; and 072-00041/2018001
Enterprise Identifier:	I-2018-001-0138
EA No.:	18-155
Licensee:	Southern California Edison Company
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

Enclosure 2

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 identified in the HI-STORM UMAX SYSTEM Final Safety Analysis Report, Revision 4, dated August 14, 2017. This was identified as a Severity Level IV violation of 10 CFR 72.190 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 it's 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.

Title 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).

Title 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. Title 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 72.190, Training and Certification 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.

Title 10 CFR 72.190 requires, in part, that the operation of equipment and controls that are identified as important to safety in the Safety Analysis Report must be limited to trained and certified personnel or be under the direct supervision of an individual with training and certification in the operation. The HI-STORM UMAX SYSTEM FSAR, Revision 4, dated August 14, 2017, specifies, in part, that the operations at the ISFSI are

governed by the HI-STORM FW SYSTEM FSAR, Revision 5, dated June 20, 2017, which specifies that the MPC lifting slings and MPC lift attachments are designated as important to safety equipment. Contrary to the above, from January 30 to August 3, 2018, the licensee failed to assure that operations of equipment and controls that had been identified as important to safety in the Safety Analysis Report were limited to trained and certified personnel or were under the direct supervision of an individual with training and certification in the operation. Specifically, the licensee's training program:

1. Failed to adequately train and certify the rigger/spotter position involved in the important to safety downloading operation.

2. Failed to have adequate proficiency testing on the controls related to the load indicating device and downloading operations for the VCT operator position.

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 identified in the HI-STORM UMAX SYSTEM FSAR, Revision 4, dated August 14, 2017. This was identified as a violation of 10 CFR 72.190 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.

Title 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. Section 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).

Title 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 assure that operations of important to safety equipment were limited to trained and certified personnel (10 CFR 72.190)
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

INSPECTION CHARTER

TO EVALUATE THE NEAR-MISS LOAD DROP EVENT AT SAN ONOFRE NUCLEAR GENERATING STATION 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.

ATTACHMENT C:

Partially Redacted Table from SCE's September 17, 2022
Supplemental Response to TURN Data Request #1
Question 22

TURN Data Request #1 Question 22
(2014$ In Millions, 100% Share)

Description	No Fuel Movement (11.5 Months)	Extended FTO Period Due to Slower Loading Rate (2.5 Months)	Total
Event-Related Costs			
Utility Staff	$ 2.0	N/A	$ 2.0
Decommissioning Advisor [1]	1.1	N/A	1.1
NRC Fees [2]	1.1	N/A	1.1
Contracted Services	1.0	N/A	1.0
ISFSI Aging Management	0.2	N/A	0.2
Association Fees and Expenses [3]	0.1	N/A	0.1
ISFSI Expansion & Fuel Transfer Operations	0.1	N/A	0.1
Third-Party Legal	0.1	N/A	0.1
Event-Related Costs Subtotal	**$ 5.7**	**N/A**	**$ 5.7**
Time-Related Costs			
Security Force	$ 12.6	$ 2.7	$ 15.3
ISFSI Oversight [4]	8.1	2.0	10.0
Utility Staff	7.9	1.7	9.7
FTO Support	[redacted]	[redacted]	[redacted]
Contracted Services			
Security Related Expenses	0.1	0.0	0.1
Time-Related Costs Subtotal	**$ 33.0**	**$ 7.2**	**$ 40.2**
Total	**$ 38.7**	**$ 7.2**	**$ 45.9**

General Notes:
(i) This summary is SCE's preliminary estimate of the costs associated with the August 3, 2018 downloading event and the associated delay, which is based on a cursory review of the available data. As additional detailed information is available, the amounts may change.
(ii) Totals my not reconcile due to rounding.

Notes:
(1) The decommissioning advisor performed activities to support a successful restart of FTO at SONGS, such as the review of the root cause evaluation and safety evaluations.
(2) Includes NRC fees outside of the no fuel movement period that are associated with additional inspections as a result of the canister handling event.
(3) Association Fees and Expenses include costs associated with the Nuclear Oversight Board ("NOB"). One of the NOB members reviewed the cause evaluations and assisted with the FTO readiness assessments.
(4) ISFSI oversight costs are recorded to the distributed ISFSI Expansion and Fuel Transfer Operations project. For purposes of this analysis, ISFSI oversight costs are all considered time-related costs; however, ISFSI oversight personnel also worked on activities specific to the canister handling event.

ATTACHMENT D:

SCE Strategic Plan for the Relocation of SONGS Spent Nuclear Fuel to an Offsite Storage Facility or a Repository

March 15, 2021

Due to the size limitation in Commission Rule 1.10 for electronically served documents, Attachment D is made available in a readable, downloadable, printable, and searchable format at http://a4nr.org/?p=4489

ATTACHMENT E:

SCE Action Plan

March 15, 2021

Southern California Edison Company
San Onofre Nuclear Generating Station

VOLUME I

ACTION PLAN FOR THE RELOCATION OF SONGS SPENT NUCLEAR FUEL TO AN OFFSITE STORAGE FACILITY OR A REPOSITORY

March 15, 2021

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

To our SONGS neighbors and community,

Southern California Edison Company (SCE) is pleased to share the Action, Strategic and Conceptual Transportation Plans for the off-site relocation of spent nuclear fuel from the San Onofre Nuclear Generating Station (SONGS). These plans reflect years of work and critical support from a team of nationally recognized leaders in nuclear waste policy, spent nuclear fuel transportation and nuclear engineering and science, as well as SONGS co-owners – San Diego Gas & Electric Company and the cities of Anaheim and Riverside.

The distribution of the plans is a significant milestone in a process that began following the 2017 settlement regarding the coastal development permit issued for SONGS' expanded spent fuel storage system. The Department of Energy was to begin transporting spent fuel from nuclear sites across the country to a repository in 1998. There are 123 canisters of spent nuclear fuel at SONGS and no available federal repository to which they can be relocated at this time.

These plans offer an analysis of the costs, opportunities and challenges of relocating spent nuclear fuel from a commercial utility and its customers. The evaluation found it unlikely that the SONGS co-owners and their customers would find a commercially reasonable path to move the spent nuclear fuel without federal government involvement. This is consistent with SCE's strong belief that its customers should not be exposed to additional costs or risks when it is the federal government's legal and contractual obligation to provide a solution.

The successful resolution of this challenge cannot come through the efforts of the SONGS co-owners alone. SCE and the counties of Orange and San Diego announced the formation of a stakeholder coalition, *Action for Spent Fuel Solutions Now*, to build momentum toward commercially reasonable off-site storage or disposal solutions and to urge the federal government to meet its legal obligations. While the coalition continues to grow, we are pleased that SONGS co-owners San Diego Gas & Electric and the City of Riverside are founding members.

While SCE recognizes that policy changes take time, as a steward for the environment and the communities it serves, SCE is pressing for federal action now.

Through these plans, SCE continues its pursuit of safe and commercially reasonable avenues for the off-site storage and/or disposal of the SONGS spent nuclear fuel. SCE respectfully looks forward to your support as it seeks to advance solutions to the spent fuel challenges facing the SONGS community and our nation.

Pedro Pizarro
President & CEO
Edison International

Kevin Payne
President & CEO
Southern California Edison Co.

Doug Bauder
Vice President,
Decommissioning and Chief Nuclear Officer, SONGS
Southern California Edison Co.

Statement of the Experts Team
on the
Plan for the Relocation of SONGS Spent Nuclear Fuel
to an Offsite Storage Location
March 15, 2021

We, the independent Experts Team, have provided advice and reviewed work products on spent fuel management at the San Onofre Nuclear Generating Station (SONGS) on behalf of Southern California Edison (SCE) for the last three years. We support the final products on spent fuel management of both the North Wind team and SCE. The studies provide a solid framework for the SONGS co-owners to move forward with the management and future removal of spent nuclear fuel (SNF) from the SONGS site. SCE has broken new ground for the U.S. nuclear industry by being one of the first sites to conduct such a detailed analysis of options for moving spent fuel off site. We applaud them for this effort.

Role of the Experts Team and Review Process

The Experts Team was formed in early 2018, consistent with provisions of the Settlement Agreement reached between SCE and Citizens' Oversight. The Experts Team included expertise in the areas of nuclear engineering, spent fuel siting and licensing, spent fuel transportation, and radiation detection and monitoring, among others. We assisted SCE in the creation of a Request for Information (RFI) to select a qualified and experienced company for the development of the Strategic Plan. When responses to the RFI were received, we provided independent input into the evaluation and ranking of the qualifications of the companies that responded to the RFI, leading to the selection of North Wind.

After North Wind had been selected, the Experts Team reviewed and provided comment on their proposed outline for the Strategic Plan and the alternatives to be assessed in the Strategic Plan. Assumptions and raw data inputs to the planning process were thoroughly vetted. We reviewed several drafts of the Strategic Plan as it was being developed and provided feedback to North Wind and SCE. The diverse and experienced backgrounds of the Experts Team members and North Wind assured wide ranging discussions of the issues affecting options for relocating the SONGS SNF offsite.

A similar process was conducted for the development of the Conceptual Transportation Plan. For this work product, key members of the Experts Team participated in weekly meetings, in conjunction with North Wind and SCE, to incorporate the Experts Team guidance early in the process for the development of the Conceptual Transportation Plan. As with the Strategic Plan, the full Experts Team reviewed and provided comments on several drafts of the Conceptual Transportation Plan.

SCE staff relied upon the "Key Findings" from the Strategic Plan and the Conceptual Transportation Plan to develop the Action Plan. The Experts Team provided review and comment as well.

The input provided by the Expert Team members on each of the three plans was fully considered and incorporated as appropriate.

Conclusion

The Experts Team has had a significant role in the development of the Action Plan, the Strategic Plan, and the Conceptual Transportation Plan. We concur that the alternatives evaluated in the Strategic Plan are those that make the most sense to evaluate in the current situation.

The Experts Team supports the "Key Findings" in both the Strategic Plan and the Conceptual Transportation Plan. The Action Plan prepared by the SCE staff appropriately incorporates these key findings. Finally, the recommendation in these documents to closely follow developments in offsite storage technology, legislative developments and changing business models for consolidated storage facilities is important as nuclear waste management options continue to evolve.

The result of this effort is that SCE will be well positioned to take advantage of any commercially reasonable opportunity to relocate spent fuel to an offsite storage facility. In addition, SCE will be in a better position to prepare spent fuel to be shipped off site. We have appreciated the opportunity to participate in this initiative.

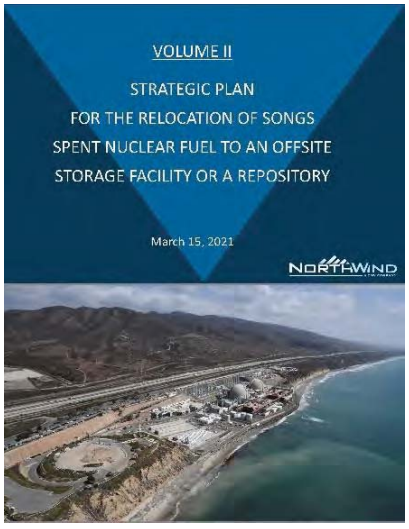
Tom Isaacs – Siting and Licensing, Chair
Dr. Allison Macfarlane – Siting and Licensing
Dr. Josephine Piccone – Radiation Detection & Monitoring
Richard C. Moore – Spent Fuel Transportation
J. Gary Lanthrum – Spent Fuel Transportation
Kristopher W. Cummings, M.S. – Nuclear Engineering

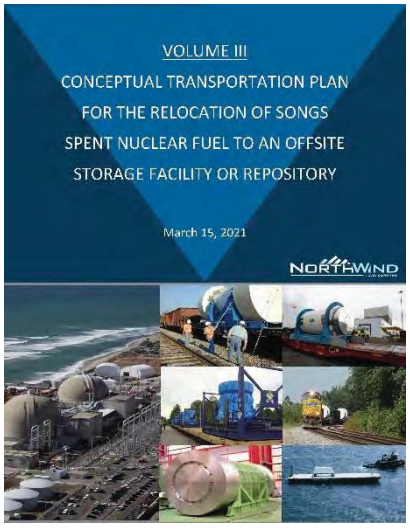
Table of Contents

1. Introduction

Through this Action Plan, the San Onofre Nuclear Generating Station (SONGS) co-owners[1] describe how they will act upon the insights, findings, recommendations and conclusions detailed in the *Strategic Plan for the Relocation of Spent Nuclear Fuel to an Offsite Storage Facility* ("Strategic Plan") and the *Conceptual Transportation Plan for the Relocation of Spent Nuclear Fuel to an Offsite Storage Facility* ("Conceptual Transportation Plan"), Volumes II and III of this compendium, respectively.[2] For convenience, this Action Plan provides cross references indicating where additional information and/or supporting discussion can be found in the Strategic and Conceptual Transportation Plans.

The overarching objective…is to…achieve the safe and commercially reasonable removal of all spent nuclear fuel (SNF) and greater-than-Class C (GTCC) low-level radioactive waste from SONGS as soon as possible.





The overarching objective for all three plans is to help the SONGS co-owners achieve the safe and commercially reasonable removal of all spent nuclear fuel (SNF) and greater-than-Class-C (GTCC) low-level radioactive waste from SONGS as soon as possible.[3]

[1] SONGS is co-owned by Southern California Edison Co. (SCE), San Diego Gas & Electric (SDG&E), and the City of Riverside. The City of Anaheim, a former SONGS owner, remains a co-participant in the decommissioning process and shares the co-owners' interest in finding an offsite solution for SONGS SNF. Where applicable, "SCE" may be used to designate responsibility for actions to be undertaken by SCE as the decommissioning agent for SONGS on behalf of the SONGS co-owners.

[2] SCE retained a consortium of consultants led by North Wind, Inc. (North Wind) to develop the Strategic and Conceptual Transportation Plans. North Wind developed these Plans with the guidance and oversight of SCE and an external Experts Team, which was comprised of six individuals with extensive, high-level experience in the field of nuclear waste management and regulation. Additional discussion regarding the role of the Experts Team is provided in Section 2.3 of the Strategic Plan (Vol. II) (*Approach to the Strategic Plan and the Role of the Experts Team*).

[3] In this Action Plan, as in the Strategic and Conceptual Transportation Plans, references to SONGS SNF should generally be understood to include SONGS GTCC waste unless otherwise specified.

Complete removal of these materials is necessary to enable the full decommissioning and restoration of the SONGS site so that the land can be returned to its owner, the U.S. Navy.[4]

Recognizing that no offsite facility currently exists that could accept the SONGS SNF and GTCC waste, the Strategic Plan explores a range of alternative pathways for pursuing this overarching objective. Several factors were considered, most critically the ability to provide an offsite solution that (1) meets rigorous regulatory requirements for safety and protection of public health and the environment and (2) can be implemented in a commercially reasonable manner.[5]

A federal solution, or at least one which encompasses a significant degree of federal support, offers the surest and most achievable path to relocating the SONGS SNF.

The results of the analysis, from both the Strategic and Conceptual Transportation Plans, point to a clear distinction between pathways that rely on the federal government's longstanding contractual and statutory obligation to take title to commercial SNF and remove it from plant sites, versus pathways that do not presume a central federal role. Put simply, a federal solution, or at least one that encompasses a significant degree of federal support, offers the surest and most achievable path to relocating the SONGS SNF. All other alternatives create uncertain but potentially large risks and costs and thus are far less likely to meet the test of commercial reasonableness, which encompasses critical considerations of cost, cost recovery, title and liability. The steps outlined in this Plan thus reflect an emphasis on federal action as the key to resolving the core SNF management challenges facing SONGS.

[4] Additional discussion of the SONGS co-owners' objectives with respect to the SONGS SNF and plant site may be found in the Strategic Plan (Vol. II), Section 2.2 (*Strategic Plan Objectives*) and in the Conceptual Transportation Plan (Vol. III), Section 8 (*Key Steps Toward Transportation Readiness*).

[5] The criterion of commercial reasonableness is articulated in detail in the August 2017 *Settlement Agreement Regarding Coastal Development Permit for Storage of San Onofre Spent Nuclear Fuel* that prompted the development of these Plans; it is also a standard that any utility, given its fiduciary responsibility to customers and shareholders, would apply in making decisions that have potentially significant cost and liability implications. Additional discussion regarding the standard of commercially reasonability is provided in Section 6.2 of the Strategic Plan (Vol. II) (*Cost Considerations and "Commercial Reasonableness"*).

2. A Framework for Action

In support of achieving the objectives for the SONGS site and implementing the Strategic and Conceptual Transportation Plans, the SONG co-owners will undertake near-term actions in four categories:

A. Pursuing relocation of SONGS spent nuclear fuel (SNF) to an offsite facility. Section 3 describes actions in support of alternatives that presume the federal government's assumption of responsibility for the SONGS SNF, including reestablishment of a federal program to dispose of SNF.

B. Catalyzing federal, state, and local support. Section 4 describes actions to encourage federal, state, and local support for the activities described in Section 3.

C. Preparing the SONGS site and SONGS SNF for offsite transportation. Section 5 describes actions at SONGS to ensure that the SNF is ready for offsite transport once a commercially reasonable offsite facility becomes available and to safely store the SNF on site in the meantime.

D. Corporate capacity building and governance. Section 6 describes corporate capacity building and governance measures in support of this Action Plan.

These actions reflect the fact, previously noted in the Introduction, that there is currently no licensed and operating facility prepared to accept SONGS SNF. Further, they reflect a recognition that the time required to develop any such offsite alternative remains uncertain.[6] The efforts described in this initial iteration of the Action Plan are in general support of the Phase I activities described in the Conceptual Transportation Plan, prior to the identification of an offsite facility.[7]

The efforts described in this initial iteration of the Action Plan are assumed to occur in general support of the Phase I activities described in the Conceptual Transportation Plan, prior to the identification of an offsite facility.

Given the recognized uncertainties surrounding when an offsite storage or disposal facility might become available, the approach of the SONGS co-owners must remain flexible and provide optionality. This Action Plan will be revisited periodically to consider the efficacy of the SONGS co-owners' actions, and to adjust future efforts in response to the changing technological and socio-political developments that will shape our national nuclear waste management landscape.

All actions will be assessed and undertaken with a focus on the health and safety of the public, SONGS workers, and the protection of the environment, as well as the prudent and commercially reasonable stewardship of customer funds.

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[6] Additional discussion regarding the likely timeframes associated developing different options for the offsite relocation of SONGS SNF is provided in the Strategic Plan, Vol. II, Section 6.7 (*Timeframe to Achieve Objective*).

[7] Additional discussion regarding near-term preparations necessary for the offsite transportation of SONGS SNF is provided in the Conceptual Transportation Plan, Vol. III, Chapter 5 (*Phase I: Near-term Actions To Prepare for Transporting SONGS SNF*).

3. Pursuing Relocation of SONGS SNF to an Offsite Facility

This section describes actions the SONGS co-owners will take to support the establishment of offsite disposal or storage facilities—*i.e.*, a permanent federal repository and/or one or more interim storage facilities—that would allow for the safe and commercially reasonable relocation of the SONGS SNF.[8] The specific actions described in this section will be taken in concert with the advocacy efforts described in Section 4.

The SONGS co-owners consider the development of a permanent federal disposal repository and revitalization of the national nuclear waste management program to be critically important, not only to implement the ultimate solution for the SONGS SNF, but also as a requisite complement to any interim storage alternative. Otherwise, the lack of an effective federal program to implement permanent disposal may call into question the interim nature of any alternative storage solution for SONGS SNF. Accordingly, the SONGS co-owners support efforts to reset the national nuclear waste management program in parallel with efforts to advance certain interim offsite storage alternatives, as considered in the Strategic Plan.

…it is the federal government's obligation to provide for the offsite disposition of SONGS SNF, including taking title to and assuming liability for the SONGS SNF…[C]ustomers should not be exposed to additional costs or risks associated with the federal government's failure to deliver a timely disposal solution."

Fundamental to this support, however, is the presumption that it is the federal government's obligation to provide for the offsite disposition of SONGS SNF, including taking title to and assuming liability for the SONGS SNF. The customers of the SONGS co-owners should not be exposed to additional costs or risks associated with the federal government's failure to deliver a timely disposal solution for SONGS SNF.[9] This is a foundational tenet of the commitments the SONGS co-owners make through this Action Plan.

3.1 Resetting the federal nuclear waste management program and support for a permanent federal disposal repository [10]

The structural reforms needed to effectively reset the federal nuclear waste management program are substantial, dependent on factors beyond the direct control or influence of the SONGS co-owners, and

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[8] In addition to the specific actions described here, the SONGS co-owners will continue monitoring developments relevant to the range of alternatives studied in the Strategic Plan, as well as emerging technologies, alternatives, and approaches to SNF management deserving of increased attention in the future. The SONGS co-owners will engage and/or support such concepts as appropriate.

[9] Additional discussion regarding the federal government's obligation to provide for the offsite disposition of SONGS SNF is provided in the Summary of the Strategic Plan, Vol. II, at p. iv ("Since the passage of the Nuclear Waste Policy Act of 1982 (NWPA), responsibility for implementing a disposal solution for SNF has rested with the federal government"), p. 28 ("The federal government has a responsibility to take title to commercial SNF and devise a solution for SNF disposal"), and in Sections 6.2 (*Cost Considerations and "Commercial Reasonableness*), 6.3 (*Legal and Regulatory Requirements and Challenges*), and 6.4 (*Title and Possession (including related issues of risk, liability, and indemnification)*).

[10] Additional discussion regarding restarting the national nuclear waste management program is provided in the Strategic Plan, Vol. II, Section 8.5 (*Restarting the National Nuclear Waste Management Program*).

likely to require significant efforts over an extended period. The SONGS co-owners can support these reforms, but their successful implementation will ultimately require a broad base of technical and focused socio-political support beyond the capabilities of the SONGS co-owners alone. Recognizing this, the SONGS co-owners will:

A1. Actively encourage several key structural reforms in support of successfully resetting the federal nuclear waste management program. Any reset of the federal nuclear waste management program should include:


Yucca Mountain, Nevada

- Establishing a path to one or more permanent geologic disposal repositories.[11]
- Authorizing federal interim storage (discussed further in Section 3.2.1 below) by developing a federal consolidated interim storage facility (CISF) and/or by allowing the U.S. Department of Energy (DOE) to contract for private storage services.
- Establishing a new single-purpose organization, ideally as an independent entity outside DOE, with mission responsibility for the safe management and final disposition of SNF in the United States. To preserve the personnel and capabilities needed to successfully address the nation's long-term (multi-decade) SNF management challenges, such an organization should be stable, properly staffed, securely funded, and insulated from short-term political changes.
- Establishing a new mechanism for consultation/collaboration between the national nuclear waste management program and state, local, and tribal authorities. Non-federal entities that have an interest, either in the location of SNF storage and disposal facilities and/or in the transportation of SNF from current reactor sites to storage or disposal facilities, are important partners in advancing the national program.
- Improving access to the approximately $41 billion[12] currently in the Nuclear Waste Fund to finance needed investments. Specific priorities include:
  - A new or modified mechanism to assure permanent and stable access to already collected ratepayer funds is needed to execute a large, multi-year capital investment program for an integrated national nuclear waste management system.

[11] The SONGS co-owners support prompt efforts by the federal government to initiate a deliberate and considered process for identifying and constructing a geologic repository for permanent SNF disposal. The SONGS co-owners take no position with respect to the suitability of the Yucca Mountain site or with respect to any decision that might be taken regarding whether to continue the licensing process for Yucca Mountain and/or pursue another repository site.

[12] *See* Strategic Plan, at p. 34 (noting the Nuclear Waste Fund had accrued approximately $42.1 billion (including interest) by the end of 2020).

- Resumption of funding for a permanent geologic repository program and in support of an immediate decision (with any required changes to the Nuclear Waste Policy Act (NWPA)) on whether to restart the licensing process for Yucca Mountain and/or begin work to identify and develop one or more alternative repository sites for the final disposal of all commercial SNF.[13]

- Clarifying criteria for the reimbursement of costs from the Nuclear Waste Fund and/or Judgment Fund in order to encourage consolidated spent fuel storage. Such clarification should include allowing reimbursement for all aspects of transportation (including indemnification as would be provided were DOE to contract for SNF shipments) and storage costs at alternate site(s), as well as addressing issues regarding SNF title transfer from the current owners to other parties, including the federal government, new public-private partnership(s), and/or wholly private entities.

- Providing federal support for preparedness capabilities among state, tribal and local entities in connection with private SNF shipments, including support for safety and emergency response training.

A2. Seek support for a new framework to prioritize federal acceptance of spent fuel from shutdown sites. The SONGS co-owners support a more efficient removal sequence for federal acceptance of SNF that better reflects the benefits and costs of clearing SNF from shutdown reactor sites. Relevant considerations should go beyond the current "oldest fuel first" approach to include a range of site-specific and systemic factors, such as status as an operating or shutdown reactor site, compatibility with decommissioning activities, risk reduction for SNF storage at reactor sites, beneficial re-use of decommissioned sites, total system cost effectiveness, shortened schedules for complete site closure, and facilitation and ease of transportation requirements. An improved framework for allocating SNF acceptance rights should provide incentives and enabling mechanisms for interested parties to negotiate amongst themselves for a more rational and efficient order of SNF removal (*e.g.*, an SNF priority list marketplace or trading platform).

3.2 Consolidated interim storage opportunities and potential federal support of same

In parallel with support for a reset of the federal nuclear waste management program, the SONGS co-owners will support the establishment of one or more CISFs that would allow for the safe and commercially reasonable relocation of the SONGS SNF. CISF opportunities are relatively mature (at least in comparison to other potential alternatives) and there has already been considerable work by the federal government and the private sector to plan for and develop consolidated storage concepts. Various federal legislative proposals have already been

The SONGS co-owners will support the establishment of one or more CISFs that would allow for the safe and commercially reasonable relocation of the SONGS SNF.

[13] *See* fn. 11, *supra.*

advanced that would support CISF opportunities, including by clarifying and expanding existing NWPA authority.[14]

Again, the federal government's assumption of responsibility for the SONGS SNF, which would avoid any additional financial burden to customers of the SONGS co-owners, is critical to satisfying the criterion of commercial reasonableness for any path forward.

3.2.1 Federal CISF

A federal CISF, or a federal contract for the use of a private CISF, would generally be consistent with historic national policy and the NWPA in terms of placing ultimate responsibility for SNF management and final disposition on the federal government. In support of federal CISF opportunities, the SONGS co-owners will:

A3. Advocate for modifications to the NWPA that would enable development of a federal CISF option that could accommodate all SONGS SNF. While the NWPA (as amended) contains two sets of provisions authorizing federal support for a CISF, neither set of provisions is workable in its current form to deliver an offsite storage alternative for SONGS SNF.[15] The federal program should have greater flexibility and broad authority to pursue multiple business models for SNF storage, including federal contracting for private storage, implementation of a federal CISF, and the formation of public-private partnerships. The SONGS co-owners support the modification of one or both of the NWPA's existing interim storage provisions to accommodate the SONGS SNF and/or changes to provide entirely new authority under a different framework.[16]

3.2.2 Private CISF

Currently, two private CISF initiatives - one in Texas and one in New Mexico – appear to be on a trajectory to receive licenses from the Nuclear Regulatory Commission (NRC) in 2021.[17] The Strategic Plan suggests SONGS SNF could be completely removed within a timeframe of approximately two

[14] Additional discussion regarding recent legislative proposals may be found in the Strategic Plan, Vol. II, Section 5.6 (*Recent Legislative Proposals*).

[15] Additional discussion regarding provisions for interim storage of SNF in the NWPA may be found in the Strategic Plan, Vol. II, at p. 29 ("The development of federal consolidated interim storage capability is constrained by current law").

[16] Additional discussion regarding a potential federal CISF alternative, may be found in see the Strategic Plan, Vol. II, Sections 7.4 (*Interim Storage in a Federal Consolidated Interim Storage Facility (CISF)*) and 7.5 (*Federal Use of a Non-Federal CISF*).

[17] Interim Storage Partners (ISP), a joint venture between Orano USA and Waste Control Specialists, is pursuing licensing of a CISF in Andrews County Texas. Holtec International (Holtec) and the Eddy-Lea Energy Alliance are pursuing the licensing of a CISF in southeastern New Mexico. Additional discussion regarding the private CISFs may be found in the Strategic Plan, Vol. II, Summary at p. xiv (referencing license approvals sought in 2021), and Sections 7.5 (*Federal Use of a Non-Federal CISF*) and 7.6 (*Non-Federal Consolidated Interim Storage Facility*).

decades once private facilities that can accept all the SNF are fully licensed and operational.[18] This timeframe is roughly compatible with the current SONGS plan for decommissioning. Other private proposals or modifications to existing proposals may be forthcoming.

Depiction of private CISF.
Source: Interim Storage Partners

Notably however, even after an NRC license is secured, significant challenges may remain and frustrate efforts to move forward with the implementation and eventual operation of these private facilities. Further, the commercial reasonableness of contracting for private storage of the SONGS SNF is unknown at this time and neither the Texas nor the New Mexico facility by itself, as currently proposed to be licensed, could accept *all* the SONGS SNF.[19]

Actions of the SONGS co-owners with respect to private CISF opportunities will be probing and tentative, including:

A4. Engage in discussions with private CISF developers (*e.g.*, Holtec International and Interim Storage Partners) concerning potential terms for use of their storage services. The SONGS co-owners will monitor progress on these facilities and engage with private CISF vendors commensurate with the status of their respective projects. This could include seeking clarification on key issues including title and possession of the SONGS SNF, performance guarantees, liability, indemnification, technical matters, cost issues, and safety considerations, in addition to financial parameters. Discussions should also include whether the CISFs will be licensed to receive the proprietary canisters of other vendors and/or whether storage vendors would support license amendments to allow use of their canister systems by competitors.

[18] *See* Strategic Plan, Vol. II, at pp. 98 (noting two decades for SONGS SNF removal once private CISF is constructed) and 106 (*id*.).

[19] SONGS has two independent spent fuel storage installations (ISFSIs): the first, permitted in 2001, uses horizontal TN Americas LLC (TN) canisters (TN is a subsidiary of Orano USA, one of the partners in ISP); the second ISFSI, permitted in 2015, uses the Holtec vertical canister system. North Wind, in its analysis of the private CISFs alternative, concluded that the ISP and Holtec facilities that are currently moving through the licensing process must either be licensed to accept their competitor's canisters, or both these private facilities would have to operational to accept all the SNF from the SONGS site. *See* Strategic Plan, Vol. II, Summary at p. xv (noting neither facility alone could accept all SONGS SNF), at p. 98 (noting an estimated two-decade timeframe to clear all SONGS SNF once the private facilities are available), at p. 93 (noting remaining questions regarding either proposed facility's ability to accept all the SONGS SNF), and at p. 106 (*id*.).

A5. Engage in discussions with the federal government regarding the role of private CISF vendors in SNF management. These discussions would proceed in parallel with any discussions with the private vendors and would include issues such as liability protection under the Price Anderson Act, federal support for SNF transportation by private entities, and continued reimbursements from the Judgment Fund.

Depiction of private CISF.
Source: Holtec

4. Catalyzing Federal, State, and Local Support for a Federal Permanent Disposal Program and Solutions to Move SNF Off Site in the Interim

The successful offsite relocation and permanent disposal of the SONGS SNF described in Section 3 will not come through the efforts of the SONGS co-owners alone. Given the combination of factors that has led to the current national-level impasse regarding SNF management and given the barriers that stand in the way of even interim relocation alternatives, success requires aligning a broad coalition of interests, including but not limited to the nuclear industry, the scientific and environmental communities, as well as local elected officials, community and tribal leaders, and state and federal legislators.

Success requires aligning a broad coalition of interests, including but not limited to the nuclear industry, the scientific and environmental communities, as well as local representatives, community and tribal leaders, and state and federal legislators.

Where possible, the SONGS co-owners will build momentum; strengthen relationships with local communities, public officials, and stakeholders; and seek collaboration with state and national allies to promote the re-establishment of an effective federal nuclear waste management program and the offsite relocation of the SONGS SNF as described in Section 3:[20]

B1. Help form a local coalition to advocate for the offsite relocation of SONGS SNF. A locally based coalition of stakeholders is needed to champion issues related to the relocation of the SONGS SNF and sustain fact-based political pressure on Congress to act.[21]

- Members of this coalition may include local governments, current and former elected officials, businesses, business organizations, chambers of commerce, community and civic organizations, law enforcement, emergency management professionals, environmental organizations, education/science organizations, organized labor, local citizens, and/or local tribal officials.

- The SONGS co-owners will play a shared leadership role and contribute resources to help form and maintain this coalition, which will work with local partners to advocate for the provisions and reforms that are needed, in legislation and through changes in agency policy, to advance the offsite relocation of SONGS SNF.

- The SONGS co-owners will foster collaboration between the local coalition and regional and national stakeholder(s), professional associations, and other stakeholder groups that support

[20] Additional discussion regarding stakeholder engagement in support of the offsite relocation of the SONGS SNF may be found in the Strategic Plan, Vol. II, Chapter 4 (*SONGS Stakeholder Relationships and Perspectives*) and Section 8.4 (*Stakeholder Trust and Engagement*).

[21] Notably, such a coalition could draw support from the work of the SONGS Community Engagement Panel (CEP) which already serves to foster communication, public involvement and education on SONGS decommissioning activities, but focuses on matters of interest to area communities rather than on changes in national or state policies. Additional information regarding the CEP may be found at SCE's SONGS Community webpage, located at https://www.songscommunity.com/community-engagement/.

the offsite relocation of SONGS SNF and efforts to revitalize the national nuclear waste management program.

B2. Develop and implement a plan for stakeholder engagement and action. This plan will describe actions to improve upon and maintain a strong relationship of trust and transparency with stakeholders. This plan will also inform how the SONGS co-owners may engage stakeholders and local communities, as well as actions such stakeholders may undertake in support of the shared goal of relocating the SONGS SNF off site. Such actions may be further informed by the work of the coalition referenced in Action B1.

B3. Designate a lead SCE point of contact for information regarding efforts and progress made to relocate the SONGS SNF off site. The SONGS co-owners will identify a single point of contact at SCE who will be responsible for transparent, consistent and timely communication in support of community collaboration and stakeholder engagement.

B4. Continue stakeholder engagement efforts to promote transparency and to solicit support to relocate the SONGS SNF off site, including:

- Exploring options to improve the efficacy of the Community Engagement Panel (CEP) where possible, including by building its capacity for sharing information, providing updates, and soliciting community input.

- Continue coordinating with Marine Corps Base Camp Pendleton, Navy and Department of Defense officials regarding SONGS decommissioning activities and activities identified in the Strategic, Conceptual Transportation, and Action Plans. This includes exploring specific opportunities to leverage the Navy's experience in nuclear matters and unique relationship to SONGS (as the owner of the underlying property) in support of the shared goal of relocating SONGS SNF offsite.

- Maintaining lines of communication regarding the Strategic, Conceptual Transportation, and Action Plans, as well as other nuclear industry trends and developments, with the California congressional delegation, state regulatory stakeholders and agencies, local governments and tribal officials, other utility owners of SNF, and public interest groups.

5. Preparing SONGS and SONGS SNF for Transportation Off Site

The SONGS co-owners will take several near-term, on-site actions to prepare for the eventual offsite transport of the SONGS SNF.

5.1 Continue to safely and securely store SONGS SNF as long as it remains on site

The SONGS co-owners will continue to maintain a safety-conscious work environment that prioritizes sound nuclear management practices, security, and environmental protection, in balance with the efficient decommissioning of the SONGS site. The SONGS co-owners will also continue to prioritize a strong safety culture, foster a self-critical SONGS organization that strives for continuous improvement, and maintain a robust corrective action program. The SONGS co-owners will implement programs for the safe storage and monitoring of the SONGS SNF[22] until an offsite facility is available:

The SONGS co-owners will implement programs for the safe storage and monitoring of the SONGS SNF until an offsite facility is available.

SONGS site with the Holtec ISFSI in the foreground.
Source: Southern California Edison Co.
(https://www.songscommunity.com/)

[22] Additional discussion regarding the safe storage and monitoring of SNF at SONGS may be found in the Strategic Plan, Vol. II, Chapter 3 (*Spent Nuclear Fuel Management at SONGS*).

C1. Continue to implement robust, on-site programs for the safe storage and monitoring of SONGS SNF. Such measures include: real-time radiation monitoring of the Holtec and TN independent spent fuel storage installations (ISFSIs) at SONGS and data sharing with surrounding communities per the requirements of the SONGS lease with the California State Lands Commission (CSLC); compliance with the NRC's aging management protocols; and implementation of the Inspection and Maintenance Program (IMP) for the Holtec ISFSI. IMP implementation includes the deployment and routine inspection of a test canister (which does not contain spent fuel) as a leading indicator of potential stress corrosion, as well as continued support for the *in-situ* metallic overlay process and/or other emergent technologies that could be applied in the unlikely event any canisters need repair.

C2. Continue support for the further development of best management practices and technological advances in spent fuel storage and management. Appropriate planning to manage canister aging and to analyze and prepare for the potential need for canister repairs will be important if progress toward an offsite solution continues to be slow. As appropriate, such activities may include:

- Monitoring domestic and international developments in nuclear waste management, assessing their potential relevance for SONGS SNF, and identifying opportunities for SONGS engagement.

- Sharing available and appropriate data regarding the management of SONGS SNF with government, industry groups, national laboratories, and vendors to contribute to the discussion of aging management issues.

- Participating in relevant demonstration projects related to long-term canister integrity and *in situ* inspection and repair techniques. These activities may broaden support for and expand the adoption of the metallic overlay canister repair technique designated for use at SONGS, while also increasing the knowledge base in support of that technique.

C3. Continue monitoring and evaluating the effects of climate change and sea-level rise at the SONGS site. The SONGS co-owners will continue to monitor and evaluate the impacts of coastal erosion and sea-level rise in accordance with the requirements of the California Coastal Commission's (CCC's) 2019 Coastal Development Permit for the decommissioning of the SONGS site (CDP) and the SONGS lease with the CSLC.[23]

[23] Special Condition 3 of the 2019 CCC CDP requires, in relevant part, that SCE submit an application to amend its CDP at or near the completion of decommissioning activities describing, among other things, coastal erosion, sea-level rise, and the remaining onshore structures at SONGS that may be exposed due to coastal processes or that would otherwise have coastal impacts if they were to remain. Further, the 2019 CSLC Lease No. PRC 6795.1 for the SONGS site also requires, in relevant part, regular reporting on sea-level rise and shoreline changes, as well as an annual summary of information related to the site's vulnerability to sea-level rise.

5.2 Prepare for future SNF shipments

The SONGS co-owners will plan for future SNF shipments consistent with the goal of expeditiously relocating SNF off site as soon as a receiving facility becomes available on commercially reasonable terms.

The SONGS co-owners will plan for future SNF shipments consistent with the goal of expeditiously relocating SNF off site as soon as a receiving facility becomes available on commercially reasonable terms.[24]

C4. Prepare and maintain the documentation required to ship SONGS SNF. Such efforts include:

- Collecting and maintaining all supporting information required to demonstrate compliance with the certificates of compliance (CoCs) for SONGS spent fuel storage canisters. CoCs specify technical requirements and operating conditions that rely on detailed descriptions of the type(s) of wastes the canisters store.

- Reviewing and documenting the compliance status of each SNF and GTCC waste canister and its contents against the current revision of the applicable transportation CoC. This includes identifying issues that potentially require amendments to transportation licenses and specific revisions to package drawings.

- Developing canister documentation packages based on applicable regulations and the assumed maximum expectations of any interim receiving facility, as well as any permanent repository.

C5. Seek appropriate and timely opportunities to validate and improve site readiness to support an SNF transportation campaign. For example, under appropriate circumstances, demonstrating the capability to successfully move SNF or GTCC canisters to an offsite facility through dry runs and/or tabletop exercises can serve to identify operational improvements and train on-site personnel before a transportation campaign takes place. Such exercises can also provide valuable insights and bolster confidence that barriers to removing all the SNF and GTCC at the site have been, or can be, safely overcome. An effort of this type could potentially be undertaken on a pilot or demonstration basis, in partnership with a private entity, other utilities, and/or the federal government.

C6. Determine on-site infrastructure and space needs for loading SONGS SNF in preparation for transport. This determination will be made sufficiently early to make needed changes in "as-left" conditions at the site after current decommissioning activities are complete (in or around 2028). For both the Holtec and TN ISFSIs, this determination will specifically encompass:

- Transferring the SNF canisters from the ISFSIs into transportation packages.

- Loading SNF transportation packages onto rail cars for offsite transport.

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[24] Additional discussion regarding preparations for the safe, offsite transport of the SONGS SNF may be found in the Conceptual Transportation Plan, Vol. III, Chapters 4 (*Site Considerations and Readiness to Ship*), 5 (*Phase I: Near-Term Actions To Prepare For Transporting SONGS SNF*), 6 (*Phase II: Actions After a Destination Is Known*), and 7 (*Phase III: Actions Within a Five-Year Timeframe For Transporting SONGS SNF*).

- Additional permitting and/or license amendments that may be required.

- Determining whether all or part of the rail sidings and spurs that will be constructed for the decommissioning of SONGS Units 2 and 3 should be left in place to be utilized for future SNF transportation.

An MP197 Package and Locomotive
Source: Orano USA website (https://www.orano.group/usa/en/our-portfolio-expertise/used-fuel-management/nuclear-transport-and-logistics)

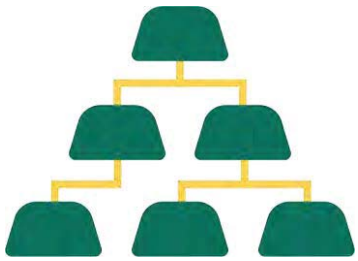
- Evaluating tradeoffs between (1) extending the existing, abandoned on-site rail spur to allow for SNF rail cars to be placed adjacent to the ISFSIs for direct loading versus (2) extending the reinforced roadway from the ISFSI area to the planned decommissioning sidings and spurs instead. This evaluation will account for the need for a self-propelled modular transporter, if a roadway extension is used; for the number of cranes and fixtures required to rotate, load and move transportation packages from the ISFSI area to rail cars; and for the ability of loaded groupings of railcars (or "consists") to negotiate the uphill grade away from the ISFSI area in the space available.

- How options for loading rail cars and assembling consists will affect the required security for these activities.

6. Corporate Capacity Building and Governance Actions

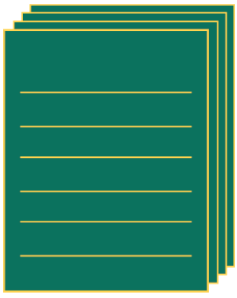
As needed and at its discretion, SCE – the decommissioning agent for SONGS - will enhance its capacity to support the offsite relocation of the SONGS SNF by taking the following steps:

D1. Aggregate select subject matter experts into an SNF relocation planning and management group (RPMG) to support the offsite relocation of the SONGS SNF. The RPMG will have the capabilities needed to carry out site readiness activities, manage efforts to relocate the SONGS SNF offsite, and coordinate ongoing stakeholder engagement activities in support of efforts to restart the national nuclear waste management program, as collectively described herein.



D2. Retain the independent strategic advisor for spent fuel management. The SONGS co-owners will continue to retain the position of Independent Strategic Advisor for Spent Fuel Management,[25] or similarly qualified individual, to advise the SONGS co-owners regarding the implementation of this Action Plan. The independent advisor will provide guidance regarding various issues, including but not limited to, readiness for offsite SNF transportation, external stakeholder engagement, legislative initiatives, issues related to title and liability for the SNF, and efforts to encourage the development of commercially reasonable options for offsite SNF storage or disposal. The independent advisor will provide recommendations and guidance to the RPMG and serve as a resource to the SONGS co-owners.

D3. Implement a "knowledge management" program to bolster the institutional memory of the RPMG and support any eventual transfer of knowledge needed to facilitate the offsite relocation of the SONGS SNF. This program will leverage existing knowledge management practices and collect relevant "primer" documents, which are expected to include, but not be limited to: an "as-left" site plan; site schematics and engineering drawings showing rail siding locations and the weight rating of surfaces; the Strategic, Conceptual Transportation, and Action Plans (with any modifications that might be added from time to time); copies of detailed SNF records and operational history; complete copies of all applicable American National Standards Institute (ANSI) and American Society for Testing and Materials (ASTM) standards; NRC-issued nuclear regulations (NUREGS) pertaining to SNF transportation; and other regulatory guidance documents relating to both SONGS ISFSIs. Given the potential for decades-long delays in the offsite relocation of the SONGS SNF and attendant losses of in-house knowledge and capacity, such documents would support any future engagement of a competent contractor to address the loading and offsite relocation of the SONGS SNF.



[25] The current Independent Strategic Advisor for Spent Fuel Management is Tom Isaacs, who also serves as Chair of the Experts Team. Details regarding the role of the Experts Team are provided in the Strategic Plan, Vol. II, Section 2.3 (*Approach to the Strategic Plan and the Role of the Experts Team*).

7. Conclusion

Success in relocating the SONGS SNF off site is most likely to be achieved by pursuing a multifaceted strategy that includes:

- Focusing near-term efforts to support options under which the federal government fulfills its legal and contractual obligations to take responsibility for SONGS SNF, including assuming title and liability, and covering the costs of transportation and offsite storage;

- Increasing awareness of the importance and challenges of nuclear waste management issues at the national level and supporting a broad-based coalition of stakeholders and legislative leaders in their efforts to overhaul and restart the national nuclear waste management program, including advancing a permanent disposal solution for all SNF; and

- Making reasonable preparations to assure that SONGS SNF can be moved to an offsite facility as expeditiously as possible when one becomes available on commercially reasonable terms.

By the actions described in this Action Plan, the SONGS co-owners will continue to pursue safe and commercially reasonable avenues for the offsite storage and/or disposal of SONGS SNF, while also setting an example that other nuclear utilities may support and follow.

SONGS site viewed from the North
Source: Southern California Edison Co. (https://www.songscommunity.com/about-decommissioning/decommissioning-san-onofre-nuclear-generating-station/decommissioning-overview)

Action Table

No.	Action
3.	**Pursuing Relocation of SONGS SNF to an Offsite Facility**
3.1	*Resetting the federal nuclear waste management program and support for a permanent federal disposal repository*
A1.	Actively encourage several key structural reforms in support of successfully resetting the federal nuclear waste management program.
A2.	Seek support for a new framework to prioritize federal acceptance of spent fuel from shutdown sites.
3.2	*CISF opportunities and potential federal support of same*
A3.	Advocate for modifications to the NWPA that would enable development of a federal CISF option that could accommodate all SONGS SNF.
A4.	Engage in discussions with private CISF developers (e.g., Holtec International and Interim Storage Partners) concerning potential terms for use of their storage services.
A5.	Engage in discussions with the federal government regarding the role of private CISF vendors in SNF management.
4.	**Catalyzing Federal, State, and Local Support for a Federal Permanent Disposal Program and Solutions to Move SNF Off Site in the Interim**
B1.	Help form a local coalition to advocate for the offsite relocation of SONGS SNF.
B2.	Develop and implement a plan for stakeholder engagement and action.
B3.	Designate a lead SCE point of contact for information regarding efforts and progress made to relocate the SONGS SNF off site.
B4.	Continue stakeholder engagement efforts to promote transparency and to solicit support to relocate the SONGS SNF off site.
5.	**Preparing SONGS and SONGS SNF for Transportation Off Site**
5.1	*Continue to safely and securely store SONGS SNF as long as it remains on site*
C1.	Continue to implement robust, on-site programs for the safe storage and monitoring of SONGS SNF.
C2.	Continue support for the further development of best management practices and technological advances in spent fuel storage and management.
C3.	Continue monitoring and evaluating the effects of climate change and sea-level rise at the SONGS site.
5.2	*Preparations for future SNF shipments*
C4.	Prepare and maintain the documentation required to ship SONGS SNF.
C5.	Seek appropriate and timely opportunities to validate and improve site readiness to support an SNF transportation campaign.
C6.	Determine on-site infrastructure and space needs for loading SONGS SNF in preparation for transport.
6.	**Corporate Capacity Building and Governance Actions**
D1.	Aggregate select subject matter experts into an SNF relocation planning and management group (RPMG) to support the offsite relocation of the SONGS SNF.
D2.	Retain the independent strategic advisor for spent fuel management.
D3.	Implement a “knowledge management” program to bolster the institutional memory of the RPMG and support any eventual transfer of knowledge needed to facilitate the offsite relocation of the SONGS SNF.