NO. 20-70899

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

Public Watchdogs,

Petitioner,

v.

U.S. Nuclear Regulatory Commission and United States of America,

Respondents,

Southern California Edison Company,

Intervenor.

PETITIONER'S EXCERPTS OF RECORD
VOLUME I

CHARLES G. LA BELLA
ERIC J. BESTE
BARNES & THORNBURG LLP
655 WEST BROADWAY, SUITE 900
SAN DIEGO, CA 92101
TELEPHONE: 619-321-5000
FACSIMILE: 310-284-3894

LUCAS C. WOHLFORD
NINTH CIR. ADMISSION PENDING
BARNES & THORNBURG LLP
2121 N. PEARL STREET, SUITE 700
DALLAS, TX 75201
TELEPHONE: 214-258-4106
FACSIMILE: 214-258-4199

Attorneys for Petitioner

EXCERPTS OF RECORD TABLE OF CONTENTS

TAB 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 26, 2020

Mr. Charles G. La Bella
Barnes & Thornburg LLP
655 West Broadway, Suite 900
San Diego, California 92101

SUBJECT: PETITION REQUESTING ENFORCEMENT ACTION UNDER SECTION 2.206 OF TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS* AGAINST SOUTHERN CALIFORNIA EDISON RELATED TO DECOMMISSIONING OEPRATIONS AT THE SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

Dear Mr. La Bella:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to the petition submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 2.206, "Requests for action under this subpart," dated September 24, 2019 (Agencywide Documents Access and Management System [ADAMS] Accession Nos. ML19309D323 and ML19311C699), as supplemented on January 21, 2020 (ADAMS Accession No. ML20023A182). The NRC's Executive Director for Operations referred your petition to the Office of Nuclear Material Safety and Safeguards (NMSS) for appropriate review or action.

Petition

In the petition, you requested that the NRC immediately suspend all decommissioning operations at the San Onofre Nuclear Generating Station (SONGS) and require Southern California Edison (SCE or the licensee) to submit an amended decommissioning plan to account for spent nuclear fuel being placed in storage at SONGS. As the basis for the request you stated: burial of spent nuclear fuel at SONGS poses an immediate threat to public safety (for example, integrity of fuel canisters); the licensee's estimated cost of decommissioning SONGS is based on unreasonable and fundamentally flawed assumptions; and the NRC has not considered the environmental and safety effects of sea level rise caused by climate change and has not addressed the environmental impacts of decommissioning on environmental justice, threatened and endangered species, offsite land use, offsite aquatic and terrestrial ecology, and certain cultural and historic resources.

Staff Action

On October 25, 2019, the NRC provided a response to Public Watchdogs by e-mail (ADAMS Accession No. ML19326A969) stating that the NRC staff concluded, in accordance with Section II.B.1 of Management Directive (MD) 8.11 "Review Process for 10 CFR 2.206 Petitions" (ADAMS Accession No. ML18296A043), that the request does not warrant immediate action. The NRC staff has determined that the decommissioning activities at SONGS do not constitute an immediate threat to public health and safety.

On December 18, 2019, the NRC informed you via e-mail (ADAMS Accession No. ML19353A048) that the petition review board (PRB) concluded that the petition did not meet the criteria for consideration under 10 CFR 2.206 because it appears that all of the issues raised in the petition have previously been the subject of NRC staff review, and do not raise concerns that the NRC staff has not previously considered and resolved. On January 21, 2020, the PRB conducted a public teleconference with Public Watchdogs at your request, to discuss the PRB's initial assessment and any supplemental information for the PRB's consideration. The transcript for the January 21st public meeting can be found at ADAMS Accession No. ML20028E467. The PRB considered the information presented during the January 21, 2020, discussion, as well as the original petition and the supplemental information submitted in reaching its final determination, as discussed below.

NRC Staff Response to Specific Concerns

Protection of Public Health and Safety. The NRC has continued to carefully regulate the licensee's decommissioning activities at SONGS, which include its review of the fuel storage facility design, inspections encompassing the physical facility as well as the licensee's operational performance, and appropriate enforcement actions. More specifically, the NRC performed a thorough review of the UMAX Independent Spent Fuel Storage Installation (ISFSI) design used at SONGS, a design the NRC approved in 2017 through a public rulemaking (ADAMS Accession No. ML16341B061). In addition, NRC staff continually performs oversight to ensure that the storage of spent nuclear fuel at SONGS does not pose a threat to public health and safety. NRC inspections of decommissioning activities at SONGS, including inspections related to the ISFSI, are documented in inspection reports that are publicly available. See for example ADAMS Accession Nos. ML18200A400 and ML19316A762.

The NRC staff has also considered the events described in the petition regarding the licensee's fuel loading operations and potential scratching of the fuel canisters. See ADAMS Accession No. ML19190A217. The NRC's regulatory review and oversight actions included a detailed assessment of the significance of the events, specific enforcement actions, and subsequent consideration of the licensee's corrective actions. Specifically, regarding integrity of the fuel canisters, NRC inspectors concluded that localized scratches (peak stresses) on the canisters are not a safety concern (using the ASME Code Section III, Subsection NB stress intensity limits as reference). NRC inspectors also concluded that canister evaluations performed by SCE using visual scratch assessments and statistical evaluations acceptable. These evaluations were adequate to demonstrate that canister scratches from incidental contact for previous and future canisters, will continue to meet the confinement design functions as specified in the UMAX Final Safety Analysis Report and ASME Code Section III canister wall thickness tolerances.

As a result, the NRC remains confident that reasonable assurance of adequate protection of the public health and safety can be maintained for as long as fuel is stored in accordance with the requirements of the SONGS license, the certificate of compliance for the UMAX system (and any other licensed systems that may be implemented in the future at the SONGS site), and other applicable requirements.

Decommissioning Cost Estimate. Regarding your concern about the estimated cost of completing decommissioning at SONGS, the NRC staff concluded in its review of the SONGS Decommissioning Cost Estimate (DCE) (ADAMS Accession No. ML15204A383) that the site-specific DCE and the cost of long-term storage of spent fuel for SONGS, Units 2 and 3, are reasonable and provide a sufficient level of detail on the funding mechanisms to meet the

requirements of 10 CFR 50.82(a)(4)(i). In addition, the NRC staff reviewed the 2019 Decommissioning Funding Status (DFS) report for SONGS and determined that the licensee complies with the decommissioning funding assurance requirements of 10 CFR 50.75 and 10 CFR 50.82, as applicable, for the 2019 DFS reporting cycle (ADAMS Accession No. ML19346E375). The SONGS DFS reports are submitted and reviewed annually by the NRC staff to ensure continued compliance with the decommissioning financial assurance requirements. Finally, the NRC safety evaluation for the SONGS Irradiated Fuel Management Plan (IFMP) (ADAMS Accession No. ML15182A256) states that "the NRC staff finds the SONGS IFMP estimates to be reasonable, based on a cost comparison with similar decommissioning reactors…."

Environmental Impacts. Regarding your concern about the environmental impacts of the decommissioning activities, the NRC staff concluded in its review of the SONGS Post Shutdown Decommissioning Activities Report (ADAMS Accession No. ML15204A383) that these activities are bounded by the previously issued NUREG-0586, "Final Generic Environmental Impact Statement [GEIS] on Decommissioning of Nuclear Facilities," and its supplements, and did not find any deviations from the previously issued Environmental Statement for SONGS (ADAMS Accession No. ML18239A414). Therefore, the NRC is confident that the environment can be adequately protected, and all impacts bounded, during decommissioning activities at SONGS.

Retrievability of Spent Fuel. On January 21, 2020, you raised concerns regarding spent nuclear fuel currently stored at SONGS being non-retrievable, in violation of10 CFR 72.122(l), and with potential impacts from flooding. Specifically, you stated that "although the Holtec Final Safety Analysis Report and Certificates of Compliance clearly contemplate a potential flooding event and state that a site-specific analysis will be submitted by Licensees, Public Watchdogs is not aware that any such analysis has been performed or submitted."

Interim Staff Guidance No. 2, Revision 2, "Fuel Retrievability in Spent Fuel Storage Applications" (ADAMS Accession No. ML16117A080), defines ready retrieval as "the ability to safely remove the spent fuel from storage for further processing or disposal." A licensee can demonstrate the ability for ready retrieval by demonstrating that it can remove a canister loaded with spent fuel assemblies from a storage cask/overpack. As discussed in NRC Supplemental Inspection Report 2018-002 for SONGS (ADAMS Accession No. ML19190A217), the NRC inspection team observed the licensee implementing all the corrective action enhancements to download and retrieve a simulated canister at the SONGS ISFSI pad, during exercises conducted between January 28-30, 2019. SCE was fully successful in downloading and retrieving the canister during the exercises, and the corrective actions taken were determined by the NRC inspectors to be adequate.

Flood Analysis. Regarding your concerns with flooding at the SONGS ISFSI, SCE's flood analyses determined that the UMAX maximum design flood parameters envelope the SONGS site flooding parameters. The NRC staff verified this flood evaluation in the SONGS 10 CFR 72.212 report to qualify the use of the UMAX system at SONGS, and the NRC documented this in an inspection report (ADAMS Accession No. ML18200A400). The NRC did not identify any issues as a result of its review of the flood evaluation for SONGS.

Having considered the results of recent inspections, the NRC's evaluation of past SONGS DFS reports, the applicable environmental documents, and the supplemental information provided, the PRB's final determination is that your petition does not meet the acceptance criteria in

MD 8.11, Section III.C.1(b), because the issues raised in the petition have been "the subject of a facility-specific or generic NRC staff review," and none of the circumstances in Section III.C.1(b)(ii) applies. The NMSS Office Director was briefed on and supported this conclusion.

Thank you for bringing these issues to the attention of the NRC.

Sincerely,

Kevin Williams Digitally signed by Kevin Williams Date: 2020.02.26 15:38:11 -05'00'

Kevin Williams, Deputy Director
Division of Materials Safety, Security, State, and Tribal Programs
Office of Nuclear Material Safety and Safeguards

Docket No(s). 50-361 and 50-362

cc: charles.labella@btlaw.com
eric.beste@btlaw.com
zachary.heller@btlaw.com
randy.gordon@btlaw.com
lwohlford@btlaw.com

Public Watchdogs
7867 Convoy Cr #302
San Diego, CA 92111

Listserv

SUBJECT: PETITION REQUESTING ENFORCEMENT ACTION UNDER SECTION 2.206 OF TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS* AGAINST SOUTHERN CALIFORNIA EDISON RELATED TO DECOMMISSIONING OEPRATIONS AT THE SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3 **DATE: February 26, 2020**

DISTRIBUTION: OEDO-19-00454
PUBLIC
RidsEdoMailCenter Resource
RidsOgcMailCenter Resource
RidsOpaMail Resource
RidsOcaMail Resource
RidsRgnIVMailCenter Resource
AAverbach, OGC
RChang, NMSS

ADAMS Accession No.: ML20038A336

OFFICE	NMSS/DUWP	NRR	NMSS/DUWP	NMSS/DFM
NAME	ZCruz Perez	PBuckberg	MDoell	JWoodfield
DATE	2/7/2020	2/10/2020	2/7/2020	2/10/2020
OFFICE	R-IV	NMSS/DFM	NMSS/MSST	DUWP
NAME	SAnderson	LHamdam	SHoliday	BWatson
DATE	2/11/2020	2/7/2020	2/7/2020	2/11/2020
OFFICE	OGC	NMSS	NMSS/MSST	
NAME	RCarpenter	JLubinski	KWilliams	
DATE	2/11/2020	2/26/2020	2/26/2020	

OFFICIAL RECORD COPY

NO. 20-70899

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

Public Watchdogs,

Petitioner,

v.

U.S. Nuclear Regulatory Commission and United States of America,

Respondents,

Southern California Edison Company,

Intervenor.

PETITIONER'S EXCERPTS OF RECORD
VOLUME II

CHARLES G. LA BELLA
ERIC J. BESTE
BARNES & THORNBURG LLP
655 WEST BROADWAY, SUITE 900
SAN DIEGO, CA 92101
TELEPHONE: 619-321-5000
FACSIMILE: 310-284-3894

LUCAS C. WOHLFORD
NINTH CIR. ADMISSION PENDING
BARNES & THORNBURG LLP
2121 N. PEARL STREET, SUITE 700
DALLAS, TX 75201
TELEPHONE: 214-258-4106
FACSIMILE: 214-258-4199

Attorneys for Petitioner

EXCERPTS OF RECORD TABLE OF CONTENTS

TAB 2

CHARLES G. LA BELLA (SBN 183448)
charles.labella@btlaw.com
ERIC BESTE (SBN 226089)
eric.beste@btlaw.com
ZACHARY P. HELLER (CA Admission pending)
zachary.heller@btlaw.com
BARNES & THORNBURG LLP
655 West Broadway, Suite 900
San Diego, California 92101
Telephone: 619.321.5000
Facsimile: 619.284.3894

RANDY GORDON
randy.gordon@btlaw.com
LUCAS C. WOHLFORD
lwohlford@btlaw.com
BARNES & THORNBURG LLP
2121 N. Pearl Street, Suite 700
Dallas, TX 75201
Telephone: 214.258.4148
Facsimile: 214.258.4199

Attorneys for Petitioner,
Public Watchdogs

UNITED STATES NUCLEAR REGULATORY COMMISSION

PUBLIC WATCHDOGS, a California 501(c)(3) corporation, Petitioner, v. SOUTHERN CALIFORNIA EDISON COMPANY AND SAN DIEGO GAS & ELECTRIC COMPANY, Licensees.	**PUBLIC WATCHDOGS SUPPLEMENT TO 10 C.F.R. § 2.206 PETITION TO IMMEDIATELY SUSPEND DECOMMISSIONING OPERATIONS AT SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3**

Pursuant to 10 C.F.R. § 2.206 and the Nuclear Regulatory Commission's ("NRC")

Management Directive 8.11, Petitioner Public Watchdogs hereby submits this Supplement to its Petition to Immediately Suspend Decommissioning Operations at San Onofre Nuclear Generating Station ("SONGS") Units 2 and 3, which was submitted to the NRC on September 24, 2019. The purpose of this Supplement is to clarify the issues raised in the Public Watchdogs' Petition and to provide the Petition Review Board ("PRB") with supplemental information relevant to the Petition, some of which was not available to Public Watchdogs at the time the Petition was filed nor to the PRB at the time it made the initial decision not to accept the Petition for review.

PRELIMINARY STATEMENT

1. Spent nuclear fuel "poses a dangerous, long-term health and environmental risk. It will remain dangerous for time spans seemingly beyond human comprehension." *New York v. NRC*, 681 F.3d 471, 474 (D.C. Cir. 2012) (internal quotations omitted). Unfortunately, long-term storage and management of spent nuclear fuel has proven to be an intractable Sisyphean task in the United States. Despite repeated efforts by Congress, federal agencies, and numerous stakeholders to construct a centralized deep geological permanent repository for the country's ever-growing stockpile of lethal, radioactive spent nuclear fuel, no viable plan currently exists for a permanent storage solution.

2. Due to the lack of a permanent repository, the majority of the country's spent nuclear fuel is stored on site at nuclear power plants. Although there is currently no permanent storage solution or even a viable plan to create one, the NRC routinely permits licensees to implement decommissioning plans and store fuel on-site, in densely populated areas, based on the false assumption that spent nuclear fuel will be removed from on-site storage facilities and transferred to a permanent repository in the relatively near future. *See* **Exhibit 1**. By permitting licensees to implement these falsely predicated decommissioning and nuclear waste burial plans, the NRC is effectively authorizing licensees to store spent nuclear fuel indefinitely without any plan or strategy for managing or funding such indefinite storage operations. The NRC's general policy of willful ignorance not only violates its own regulations and policies, but it also equates to a

complete abdication of the NRC's paramount statutory obligation to protect public health and safety.

3. As explained in Public Watchdogs' Petition, the NRC's policy of willful ignorance has created unique and particularly acute public health and safety risks at SONGS. Licensees are burying spent nuclear fuel in the SONGS Independent Spent Fuel Storage Installation ("ISFSI") pursuant to a decommissioning plan that is predicated on the arbitrary and erroneous assumption that all spent nuclear fuel being stored at SONGS will be accepted by the Department of Energy and transferred to an offsite permanent repository by 2049. Situated a mere 108 feet from one of California's most populated public beaches, only inches above the median high tide level, within an officially designated tsunami inundation zone, and surrounded by active fault lines, the SONGS ISFSI is in the most perilous location possible. To make matters worse, Licensees are burying spent nuclear fuel at SONGS in defective and damaged canisters that are only warranted to last 25 years. By Licensees' own public admissions, technology does not currently exist that would enable Licensees to retrieve these canisters and safely repackage the tons of radioactive spent nuclear fuel contained therein if and when a canister fails or even if routine replacement of the canisters becomes necessary. Furthermore, Licensees have been unable to design or develop an underground monitoring system or Aging Management Plan as required by the "Special Conditions" imposed by the California Coastal Commision nuclear waste burial permit granted October 6, 2015. Thus, the NRC, by its own negligent enforcement, is allowing Licensees to bury one of the most dangerous substances known to human kind, in one of the most dangerous places imaginable, in defective and damaged canisters that cannot be monitored, retrieved, or repaired, all pursuant to a decommissioning plan that is predicated on the knowingly false assumption that all spent nuclear fuel will be removed from SONGS and transferred to a centralized permanent repository in the relatively near future. Despite the grave public health and safety hazards posed by this reckless course of action, Licensees have made clear that they intend to bury all spent nuclear fuel at SONGS as quickly as possible. What's more, the

NRC has also made clear that it will neglect to regulate Licensees' violations of federal law, thereby using its regulatory authority to facilitate the hasty and unsafe burial of all spent nuclear fuel at SONGS.

4. Since Public Watchdogs filed its Petition, Licensees have publicly admitted that continued storage of spent nuclear fuel at SONGS is not feasible, and that there is currently no viable alternative. In addition, state regulators recently delayed the release of more than $400 million in decommissioning trust funds, imperiling Licensees' ability to continue its decommissioning operations at all, much less safely. Based on these troubling recent developments, as well as the various public health, safety, and environmental concerns identified in the Petition, Public Watchdogs respectfully requests that the NRC issue an order immediately suspending all decommissioning operations at SONGS, including all spent fuel transfer operations, and requiring Licensees to submit an amended decommissioning plan that properly accounts for the reality that spent nuclear fuel will likely remain buried at SONGS indefinitely.

CLARIFICATION AND SUPPLEMENTATION OF GROUNDS FOR IMMEDIATELY SUSPENDING DECOMMISSIONING OPERATIONS

I. RECENT EVENTS CONFIRM THAT LICENSEES CANNOT ENSURE THEIR FINANCIAL ABILITY TO PAY FOR THE TOTAL COST OF DECOMMISSIONING AND LONG TERM SPENT FUEL MANAGEMENT.

5. Although the NRC's Generic Environmental Impact Statement ("GEIS") for the long term storage of spent nuclear fuel finds that spent nuclear fuel can be stored on-site for an indefinite period without significant environmental impact, the GEIS does not authorize, license, or otherwise permit licensees to store spent fuel for any length of time. *See* NUREG-2157. Moreover, the GEIS validates that indefinite on-site storage of spent nuclear fuel will require periodic repackaging of spent nuclear fuel and replacement of spent nuclear fuel canisters, as well as long term security to protect the stored spent nuclear fuel from terrorist attack or other radiological sabotage. *Id.*

6. NRC regulations require licensees to provide assurance that they will have sufficient financial resources to pay for the total cost of decommissioning a nuclear power plant and managing spent nuclear fuel. *See* 10 C.F.R. 50.75, 50.82, and 72.30. As NRC Chairwoman Allison Macfarlane stated in her comments to the Final Rule for the Continued Storage of Spent Nuclear Fuel, there are "significant uncertainties" associated with the indefinite and risky on-site storage of spent nuclear fuel, including "the lack of experience in repeatedly repackaging spent fuel into new storage devices over time," "the lack of a guarantee that responsible parties would pay for the costs of repackaging over time," and "unforeseen events in our natural environment and society." *See* **Exhibit 2**. Indeed, Chairwoman Macfarlane presciently predicted that "[d]ecommissioned licensees will likely not have sufficient revenue to pay for the reoccurring expenses such as repackaging of spent fuel, construction of dry transfer facilities, and increased security needs assumed in the GEIS." *Id.*

7. At a SONGS Community Engagement Panel on November 21, 2019, Licensees implicitly conceded that indefinite storage of spent nuclear fuel at SONGS is not feasible and they acknowledged that they are working to develop a strategy to relocate the SONGS spent fuel to an offsite storage or disposal facility. *See* **Exhibit 3**. Although Licensees' entire decommissioning plan, including their decommissioning cost estimate and irradiated fuel management plan, is predicated on the assumption that spent nuclear fuel will be removed from SONGS by 2049, Licensees acknowledged at the Community Engagement Panel that they have not even identified a receiving site, much less established a viable plan to remove all spent nuclear fuel from SONGS by 2049. *Id.* In other words, Licensees publicly admitted that the fundamental predicate for their entire decommissioning plan is false.

8. On December 4, 2019, Licensees sought authorization from the Public Utilities Commission of the State of California ("CPUC") to disburse more than $400 million from the SONGS decommissioning trust fund to pay for various 2020 decommissioning costs, including fuel transfer operations. *See* **Exhibit 4**. This

represented a nearly threefold increase in the amount of funds Licensees' previously estimated would be necessary to perform 2020 decommissioning and spent nuclear fuel transfer operations. *Id.* On January 6, 2020, following Public Watchdogs' objection, the CPUC suspended the disbursement of these funds for up to 120 days, finding that Licensees' request requires further staff review. *Id.* The CPUC decision also includes options to extend the suspension beyond the 120-day period, if necessary.

9. As discussed in Public Watchdogs' Petition, Licensees' entire decommissioning plan is predicated on the false assumption that all spent nuclear fuel will be removed from SONGS by 2049. Based on this assumption, Licensees have only assured the NRC that they will have enough funds to pay for decommissioning and spent fuel management through 2049. Given Licensees' recent public acknowledgement that they have not identified a receiving site for SONGS' spent nuclear fuel, much less developed a viable plan to remove all spent nuclear from SONGS by 2049, Licensees' assurances regarding their ability to pay the full cost of decommissioning and spent fuel management are not credible. Moreover, CPUC's recent decision to suspend disbursements from the SONGS decommissioning trust fund further undermines Licensees' assurances that they have sufficient funds available to them to pay the full cost of decommissioning and spent fuel management. Because Licensees are unable to provide the financial assurances required by NRC regulations, the NRC should immediately suspend all decommissioning activities at SONGS and require Licensees to submit a new decommissioning plan that accounts for the reality that Licensees will have to bear the cost of spent fuel management indefinitely. At minimum, the NRC should suspend all decommissioning activities until such time as the CPUC approves the disbursement of SONGS decommissioning funds for 2020. Without such funds, Licensees will have a perverse incentive to cut corners and ignore safety requirements, which will significantly increase the already prodigious risks to public health and safety associated with Licensees' continued decommissioning and fuel transfer operations.

II. LICENSEES ARE VIOLATING NRC REGULATIONS BY BURYING SPENT NUCLEAR FUEL AT SONGS IN A STORAGE SYSTEM THAT DOES NOT ALLOW FOR READY RETRIEVAL OF THE FUEL.

10. Under NRC regulations, "[s]torage systems must be designed to allow ready retrieval of spent fuel, high-level radioactive waste, and reactor-related GTCC waste for further processing or disposal." *See* 10 C.F.R. 72.122(l). As discussed in Public Watchdogs' Petition, Licensees have publicly acknowledged that technology does not currently exist that would enable Licensees to retrieve the canisters being buried at SONGS and repackage the tons of spent nuclear fuel contained therein if and when a critical failure of the canisters occurs or even if routine replacement of a canister becomes necessary. *See* Public Watchdogs' Petition at Exhibit 18. Moreover, Licensees have publicly acknowledged that any technology for unloading a canister that might be developed in the future would require a spent fuel pool or a dry transfer facility. *Id.* Significantly, Licensees have recently confirmed that they intend to demolish the spent fuel pools and the fuel handling building at SONGS as soon as all spent nuclear fuel is transferred from the spent fuel pools to the ISFSI, which is imminent since the Licensee projects the burial will be completed prior to July 15, 2020. *See* **Exhibit 3**; *see also* **Exhibit 5** at p. 11-12. Thus, Public Watchdogs respectfully submits that the spent nuclear fuel being buried at SONGS is currently unretrievable in violation of NRC regulations, and that Licensees' own admissions confirm that the spent nuclear fuel will be completely unretrievable by this summer, when the spent fuel pools are demolished. For this additional reason, the NRC should suspend all decommissioning activities at SONGS, including all spent fuel transfer operations, and require Licensees to submit a decommissioning plan that complies with NRC regulations.

III. THE SONGS ISFSI IS OPERATING IN AN UNANALYZED CONDITION.

11. As discussed at length in Public Watchdogs' Petition, the precarious location of the SONGS ISFSI—only feet from the Pacific Ocean, in a tsunami inundation zone, and between active fault lines—makes it uniquely susceptible flooding. The potential

consequences of a flooding event would be disastrous, including, but not limited to, canister deformation or rupture and the simultaneous release of radioactive "geysers" from the ISFSI. Although the Holtec Final Safety Analysis Report and Certificates of Compliance clearly contemplate a potential flooding event and state that a site specific analysis will be submitted by Licensees, Public Watchdogs is not aware that any such analysis has been performed or submitted. Accordingly, the SONGS ISFSI is operating in an unanalyzed condition, and all decommissioning operations, including all spent fuel transfer operations, should be suspended until such an analysis is performed.

CONCLUSION

12. For the reasons set forth in this supplement, and for the reasons set forth in Public Watchdogs' Petition, Public Watchdogs respectfully requests that the NRC enter an order immediately suspending all decommissioning operations at SONGS, including all spent fuel transfer operations, and requiring Licensees to submit an amended decommissioning plan that properly accounts for the reality that the spent nuclear fuel being buried at SONGS will likely remain there indefinitely.

Dated: January 21, 2019

BARNES & THORNBURG LLP

By: /s/ Charles G. La Bella
Charles G. La Bella
Attorneys for Plaintiff
Public Watchdogs

EXHIBIT 1

Entergy Nuclear Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213
Tel: (601)368-5000

Mandy K. Halter
Director, Nuclear Licensing

10 CFR 50.54

November 16, 2018

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Update to Spent Fuel Management Plan Pursuant to 10 CFR 50.54(bb)
Pilgrim Nuclear Power Station

Docket No. 50-293
Renewed License No. DPR-35

LETTER NUMBER: 2.18.071

REFERENCES:

1. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Spent Fuel Management Plan Submittal in accordance with 10 CFR 50.54(bb)," 2.07.055, dated June 7, 2007 (ML071700121)

2. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Response to NRC Request for Additional Information (RAI) Regarding Pilgrim Nuclear Power Station Spent Fuel Management Plan Pursuant to 10 CFR 50.54(bb)," 2.08.018, dated April 9, 2008 (ML081060520)

3. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Response to Request for Additional Information to Support the Review of the Pilgrim Nuclear Power Station Spent Fuel Management Plan Pursuant to 10 CFR 50.54(bb) and the Preliminary Decommissioning Cost Estimate Pursuant to 10 CFR 50.75(f)(3)," 2.08.052, dated October 14, 2008 (ML082910039)

4. Letter, USNRC to Entergy Nuclear Operations, Inc., Pilgrim Nuclear Power Station - Safety Evaluation Re: Spent Fuel Management Program and Preliminary Decommissioning Cost Estimate (TAC Nos. MD8036 and MD9416), 1.09.001, dated January 7, 2009 (ML083190292)

5. Letter, Entergy Nuclear Operations, Inc. to USNRC, "Notification of Permanent Cessation of Power Operations," 2.15.080, dated November 10, 2015 (ML15328A053)

Dear Sir or Madam:

In accordance with 10 CFR 50.54(bb), Entergy Nuclear Operations, Inc. (ENOI) is hereby notifying the NRC of significant changes to the Pilgrim Nuclear Power Station (PNPS) Spent Fuel Management Plan.

Pursuant to 10 CFR 50.54(bb), ENOI initially submitted a Spent Fuel Management Plan on June 7, 2007 (Reference 1), as supplemented by its responses to the NRC staff's Requests for Additional Information, which ENOI submitted on April 9, 2008 (Reference 2) and October 14, 2008 (Reference 3). On January 7, 2009, the NRC staff approved the PNPS Spent Fuel Management Plan on a preliminary basis (Reference 4).

By letter dated November 10, 2015, ENOI notified the NRC of its intent to permanently cease power operations at PNPS no later than June 1, 2019 (Reference 5). As a result of its decision to permanently cease operations at PNPS and related changes to the anticipated schedule of decommissioning activities, spent fuel management activities, and decommissioning funding assumptions, ENOI is modifying the PNPS Spent Fuel Management Plan. This submittal provides the required Section 50.54(bb) notification. Attachment 1 provides the Updated Spent Fuel Management Plan (SFMP), which supersedes all prior versions of the SFMP.

There are no new regulatory commitments contained in this letter.

Should you have any questions concerning this letter or require additional information, please contact Mr. Peter J. Miner at (508) 830-7127.

Sincerely,

Mandy K Halter

MKH/shr

Attachment: 1. Pilgrim Nuclear Power Station Updated Spent Fuel Management Plan

cc:

Mr. David C. Lew
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
2100 Renaissance Blvd, Suite 100
King of Prussia, PA 19406-2713

Mr. John Lamb, Senior Project Manager
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-9D12
Washington, DC 20555-0001

Mr. John Giarrusso, Jr.
Planning, Preparedness and Nuclear Section Chief
Mass. Emergency Management Agency
400 Worcester Road
Framingham, MA 01702

Mr. John Priest, Director
Massachusetts Department of Public Health
Radiation Control Program
Commonwealth of Massachusetts
529 Main Street, Suite 1M2A
Charlestown, MA 02129-1121

NRC Resident Inspector
Pilgrim Nuclear Power Station

Attachment 1

Letter 2.18.071

Pilgrim Nuclear Power Station

Updated Spent Fuel Management Plan

Pilgrim Nuclear Power Station
Updated Spent Fuel Management Plan

I. Background and Introduction

Entergy Nuclear Operations, Inc. (ENOI) submitted a Spent Fuel Management Plan on June 7, 2007 (Reference 1), as supplemented by its responses to the NRC staff's Requests for Additional Information, which ENOI submitted on April 9, 2008 (Reference 2) and October 14, 2008 (Reference 3). ENOI submitted its plan pursuant to 10 CFR 50.54(bb), which requires power reactor licensees to submit a spent fuel management and funding program for NRC review five years prior to the expiration of a reactor operating license. At the time, the PNPS operating license was set to expire on June 8, 2012. On January 7, 2009, the NRC staff approved the PNPS Spent Fuel Management Plan on a preliminary basis (Reference 4).

By letter dated November 10, 2015, ENOI notified the NRC of its intent to permanently cease power operations at PNPS no later than June 1, 2019 (Reference 5).

Pursuant to 10 CFR 50.54(bb), licensees are required to notify the NRC of any significant changes to their proposed spent fuel management plans. As a result of its decision to permanently cease operations at PNPS and related changes to the anticipated schedule of decommissioning activities, irradiated fuel management activities, and decommissioning funding assumptions, ENOI is modifying the PNPS Spent Fuel Management Plan (SFMP). This submittal provides the required Section 50.54(bb) notification, and this Updated SFMP supersedes all prior versions of the SFMP.

Pursuant to 10 CFR 50.82(a)(4)(i), on November 16, 2018, ENOI submitted a Post Shutdown Decommissioning Activities Report (PSDAR) for PNPS that included a site-specific decommissioning cost estimate (DCE) as an attachment (Reference 6). The DCE describes the bases for the assumptions regarding the U.S. Department of Energy's (DOE) acceptance of spent fuel from the industry and from PNPS. As discussed in the DCE (and subject to the assumptions, qualifications, and reservations stated therein), the SFMP is based on the assumption that DOE will commence acceptance of PNPS's spent fuel in 2030 and complete removal of all spent fuel from the site in 2062, consistent with the current DOE spent fuel management and acceptance strategy.[1] The DCE identifies the details, schedules, and costs of spent fuel management activities associated with the SFMP, along with license termination and site restoration activities and costs.

[1] As noted in the DCE, DOE's repository program assumes that spent fuel is accepted for disposal from the nation's commercial nuclear plants in the order in which it was removed from service ("oldest fuel first"). The contracts that U.S. generators have with the DOE provide a number of mechanisms for altering the oldest fuel first allocation scheme, including emergency deliveries, exchanges of allocations amongst generators, and the option of providing priority acceptance from permanently shut down nuclear reactors. PNPS will seek the most expeditious means of removing fuel from the site when DOE commences performance. Given DOE's failure to accept fuel under its contracts, however, it is unclear how these mechanisms will operate once DOE begins accepting spent fuel from commercial reactors. Accordingly, for planning purposes only, this SFMP conservatively assumes that DOE will accept spent fuel in an oldest fuel first order.

II. Spent Fuel Management Strategy

At the time of shutdown, there will be a total of 4,114 spent fuel assemblies at the PNPS site, including 580 fuel assemblies residing in the reactor as part of the current operating cycle, 2,378 spent fuel assemblies stored in the spent fuel pool, and 1,156 assemblies stored in 17 dry storage casks on an independent spent fuel storage installation (ISFSI) facility. In 2014, construction of the ISFSI pad was completed, which PNPS operates under the General License in 10 CFR 72.210. PNPS uses the Holtec HI-STORM 100 dry cask storage system for the spent fuel that is currently stored on the ISFSI. The system consists of a multipurpose canister (MPC) with a nominal capacity of 68 fuel assemblies and a concrete storage overpack. The existing ISFSI pad was constructed with a capacity of 40 dry storage casks, which is administratively limited to a capacity of 38 casks to allow for cask movement and access. PNPS completed fuel loading campaigns to the ISFSI in 2015, 2016, and 2018.

As indicated in the PNPS PSDAR (Reference 6), PNPS owner Entergy Nuclear Generation Company (ENGC) has selected the SAFSTOR decommissioning option. The SFMP assumes that radiological decommissioning is completed within 60 years of permanent plant shutdown (i.e., by June 1, 2079). Following shutdown, the reactor building will be operated as an interim wet fuel storage facility for approximately three years after operations cease. During this time period, the spent fuel residing in the storage pool will be transferred to dry storage. The ISFSI will remain operational until DOE is able to complete the transfer of the fuel to a repository or interim storage facility.

The PSDAR and DCE describe three major phases related to spent fuel management at PNPS, which are summarized below.[2]

Table 1 - Spent Fuel Management Plan: Summary Schedule and Costs

Decommissioning Period	Start	End	Approximate Duration (Years)	Estimated Cost (thousands of 2018 dollars)
Periods 0 and 1: Planning and Preparations for Dormancy	2018	March 2020	1.84	$93,869
Period 2a: Dormancy with Wet Fuel Storage	March 2020	2022	2.8	$134,770
Period 2b: Dormancy with Dry Fuel Storage	2022	2062	40	$191,611
TOTAL			**44.64**	**$420,250**

[2] Appendix C to the DCE (Reference 6, Attachment 1) includes a detailed cost analysis of all decommissioning activities, including spent fuel management activities, by period.

1. Pre-Shutdown Planning and Preparations for SAFSTOR Dormancy

   Pre-shutdown spent fuel management planning activities include designing a consolidated ISFSI facility that will include a single storage pad that will have space to accommodate a total of 61 casks, which will allow for dry storage of all spent fuel assemblies generated during the plant's operational history. The planned location for the consolidated ISFSI facility is in an area of the site that is southwest of the power block.

   The estimated spent fuel management costs associated with ISFSI design, and other expenses during this initial phase, such as emergency planning and preparations for dormancy, total approximately $93.9 million.

2. Dormancy with Wet Fuel Storage

   The initial decommissioning activities to be performed after plant shutdown will focus primarily on preparing the plant for a period of safe-storage (also referred to as dormancy) and constructing the consolidated ISFSI facility. During this phase, spent fuel will remain in the spent fuel pool until it meets the criteria for transfer to dry storage. PNPS expects to begin construction of the consolidated ISFSI pad in 2019, assuming the timely receipt of required permits.

   PNPS expects to begin transferring the remaining spent fuel from the spent fuel pool to dry storage in 2020 and to complete the transfer of all fuel to the consolidated ISFSI by mid-2022. In addition, the 17 casks that are currently stored on the existing ISFSI pad will be relocated to the consolidated ISFSI facility. In total, 4,114 spent fuel assemblies will be stored in 61 dry cask systems on the new consolidated ISFSI pad. After the fuel transfer is completed, the pool will be drained and supporting systems will be de-energized for the remainder of the dormancy period.

   Costs in this phase total approximately $134.8 million and include: construction of the consolidated ISFSI facility (including the new storage pad, other ISFSI infrastructure, and related security modifications), 44 additional dry cask systems, and transferring fuel from the spent fuel pool to the ISFSI.

3. Dormancy with Dry Fuel Storage

   During this phase, the spent fuel will remain stored on the ISFSI until DOE accepts the fuel and removes it from the site. As discussed above and in the DCE (Reference 6, Attachment 1), for planning purposes, the SFMP assumes that DOE will begin removing fuel from PNPS in 2030 and will complete the removal of all spent fuel from the site in 2062, according to the schedule set forth in Table 2 below.

   During this phase, programs and procedures required to support safe operation of the ISFSI will be maintained in accordance with applicable requirements. Equipment maintenance, monitoring, and inspection will be performed as necessary. PNPS will also maintain a 24-hour security force, which will safeguard the spent fuel for as long as it remains on site. A security barrier, sensors, alarms, and other surveillance equipment will be maintained as required to provide security for the spent fuel. The estimated average annual cost to operate the ISFSI during this phase is

approximately $5 million, which reflects the portion of the total site caretaking costs that is allocated to the Spent Fuel Management cost category.

Late in the dormancy period, additional activities will include transferring the spent fuel from the ISFSI to the DOE. The estimated cost for the eventual transfer of the MPCs to a DOE-provided transport vehicle for off-site disposal is approximately $10.5 million.[3]

The total estimated spent fuel management cost associated with this phase is approximately $191.6 million.

Table 2 - Spent Fuel Management Schedule
(Fuel Assembly Totals by Location)

Year	Pool Inventory	ISFSI Inventory	DOE Acceptance
2018	2,378	1,156	
2019	2,958	1,156	
2020	2,958	1,156	
2021	2,958	1,156	
2022	0	4,114	
2023		4,114	
2024		4,114	
2025		4,114	
2026		4,114	
2027		4,114	
2028		4,114	
2029		4,114	
2030		4,094	20
2031		3,962	132
2032		3,534	428
2033		3,534	0
2034		3,442	92

[3] As noted in the DCE (Reference 6, Attachment 1), DOE has breached its obligations to remove fuel from reactor sites on the contracted schedule, and has also failed to provide plant owners with information about how it will ultimately perform and fulfill its obligation. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to the Standard Contract, but DOE has not explained what costs any such amendment would involve. Consequently, the plant owner has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will specifically deal with already-canistered fuel, and for purposes of the DCE only, the PNPS DCE assumes that there will be no additional costs associated with DOE's acceptance of such fuel, as such fuel will be contained in MPCs developed to be suitable for storage, transport and permanent disposal. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers, and to dispose of existing containers.

NMC
Committed to Nuclear Excellence

Nuclear Management Company, LLC

April 21, 2006

L-HU-06-16
10 CFR 50.75
10 CFR 50.54

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Palisades Nuclear Plant
Docket No. 50-255
License No. DPR-20

Irradiated Fuel Management Plan and Preliminary Decommissioning Cost Estimates for Palisades Nuclear Plant

References: 1) Nuclear Management Company, LLC (NMC) letter to US Nuclear Regulatory Commission (NRC), "Application for Renewed Operating License," dated March 22, 2005. (ADAMS Accession No. ML050940434)

2) Nuclear Management Company, LLC (NMC) letter to US Nuclear Regulatory Commission (NRC), "Decommissioning Funding Status," dated March 22, 2006. (ADAMS Accession No. ML060810686)

The enclosed Irradiated Fuel Management Plan (Enclosure 1) and Preliminary Decommissioning Cost Estimate (Enclosure 2) are being submitted in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.54(bb) "Conditions of Licenses," and 10 CFR 50.75(f)(2), "Reporting and Recordkeeping for Decommissioning Planning," respectively, for the aforementioned plant. As holder of the plant operating license, Nuclear Management Company, LLC (NMC) is submitting these reports on behalf of the plant owner, Consumers Energy. The financial information presented herein reflects information provided to NMC by the plant owner, Consumers Energy.

Pursuant to 10 CFR 50.54(bb), a licensee shall "submit written notification to the Commission for its review and preliminary approval of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor following permanent cessation of operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository." Accordingly, the Irradiated Fuel Management Plan (Enclosure 1) is provided for your review and preliminary approval.

Additionally, 10 CFR 50.75(f)(2), "Reporting and recordkeeping for decommissioning planning" states, "each power reactor licensee shall at or about 5 years prior to the projected end of operations submit a preliminary decommissioning cost estimate which includes an up-to-date assessment of the major factors that could affect the cost to decommission." Accordingly, the Preliminary Decommissioning Cost Estimate (Enclosure 2) is provided for your review and approval.

NMC submitted a sufficient application for renewal of an operating license (Reference 1) and therefore, in accordance with 10 CFR 2.109, "Effect of Timely Renewal Application," "the existing license will not be deemed to have expired until the application has been finally determined." Although NMC is seeking license renewal, the Irradiated Fuel Management Plan and Preliminary Decommissioning Cost Estimate are submitted based on the current operating license expiration date of March 24, 2011 for Palisades Nuclear Plant. If Palisades' license is renewed, the current Irradiated Fuel Management Plan and Preliminary Decommissioning Cost Estimate would no longer be applicable and a new plan and cost estimate will be submitted in accordance with 10 CFR 50.54(bb) and 10 CFR 50.75(f)(2), respectively.

This letter contains no new commitments and no revisions to existing commitments.

Edward J. Weinkam
Director, Nuclear Licensing & Regulatory Services
Nuclear Management Company, LLC

Enclosures (2)

cc: Regional Administrator, USNRC, Region III
NRR Project Manager, Palisades Nuclear Plant, USNRC
NRC Resident Inspector, Palisades Nuclear Plant, USNRC
Consumers Energy:
Manager of Depreciation and Decommissioning, Jan Anderson
Asset Manager, Steve Wawro

Enclosure 1

Irradiated Fuel Management Plan For Palisades Nuclear Plant

Background

The Preliminary Decommissioning Cost Estimate (see Enclosure 2) in accordance with 10 CFR 50.75(f)(2) for Palisades Nuclear Plant (PNP) evaluates a SAFSTOR decommissioning option with a March 2011 shutdown date. The Irradiated Fuel Management Plan is also based on the SAFSTOR analysis and March 2011 shutdown date. There are two licensed independent spent fuel storage installations (ISFSIs) on the PNP site. The newly constructed ISFSI was designed to store all spent fuel in dry storage if needed, including spent fuel currently stored in the old ISFSI. Consumers Energy reserves the right to choose the ultimate decommissioning option in accordance with its business needs, recognizing the need to ensure the chosen option meets NRC requirements for decommissioning funding

This Irradiated Fuel Management Plan also considers impact of the spent fuel currently stored at Consumers Energy's Big Rock Point Nuclear Plant (BRP) in Charlevoix County, Michigan. BRP was permanently shut down on August 29, 1997. The spent fuel currently resides in an on-site ISFSI.

Spent Fuel Management Strategy

The NRC requires (10 CFR 50.54(bb)) that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the U. S. Department of Energy (DOE). Interim storage of the fuel will be in the storage pool and/or ISFSIs located on the PNP site until the DOE has completed the transfer. The ISFSIs are independently licensed and operated and will accommodate the inventory of spent fuel residing in PNP's storage pool at the conclusion of the required cooling period. The newly constructed ISFSI was designed to store all spent nuclear fuel on-site. Once the spent fuel is emptied, the Auxiliary Building can be prepared for long-term storage.

The spent fuel pool will remain operational for a minimum of eight years following the cessation of operations. The pool will be isolated and a spent fuel island created. Over the eight-year period, the spent fuel will be packaged into transportable steel canisters for loading into DOE-provided transport casks. The canisters will be stored in concrete overpacks at the PNP ISFSIs until the DOE is able to receive them.

The shipping of spent nuclear fuel assemblies to DOE during decommissioning is based upon several assumptions. Consumers Energy directed TLG Services, Inc, to prepare the "Decommissioning Cost Study for Palisades Nuclear Plant" using 2010 as the year DOE would begin accepting spent fuel. The DOE generator allocation/receipt schedules are based upon the oldest fuel receiving the highest priority, and Consumers Energy has no allocations in year 1. It is assumed that the BRP would first use Consumers' allocations, beginning in year 2. Shipment of PNP spent fuel would commence once BRP spent fuel had been completely removed from the site. For purposes of the TLG study, this date was assumed to be 2013. However, any delay in the startup of the repository or decrease in the rate of acceptance will correspondingly prolong the transfer

process and result in the fuel remaining at the site longer. In the SAFSTOR scenario, spent fuel is expected to remain at the site for approximately 37 years after the cessation of operations. Consequently, costs are included within this analysis for the continued operation of the storage pool and ISFSIs, as required, and for the long-term caretaking of the spent fuel until the year 2048. At the conclusion of the spent fuel transfer process, each ISFSI will be decommissioned.

Operation and maintenance costs for the storage facilities (ISFSIs and the spent fuel pool) are included within the estimate below and address the cost for staffing the facilities, maintenance of necessary operational requirements as well as security, insurance, and licensing fees. The estimate includes the costs to purchase, load, and transfer the fuel storage canisters to an ISFSI. A cost-estimate for spent fuel management at PNP under the SAFSTOR scenario may be found in Table 2.

In the event that PNP ceases operation in 2011, PNP will continue to comply with existing NRC licensing requirements, including the operation and maintenance of the systems and structures needed to support continued operation of the spent fuel pool and each ISFSI, as necessary, under the decommissioning scenario ultimately selected. In addition, PNP will also comply with applicable license termination requirements in accordance with 10 CFR 50.82 with respect to plant shutdown and post-shutdown activities including seeking such NRC approvals and on such schedules as necessary to satisfy these requirements consistent with the continued storage of irradiated fuel.

Cost Estimate and Funding For Spent Fuel Management Based on the SAFSTOR Decommissioning Option

The "Decommissioning Cost Study for Palisades Nuclear Plant," developed by TLG Services, Inc. included cost estimates of $297.9 million for spent fuel management, $584.1 million for decommissioning and $78.3 million for site restoration using a SAFSTOR scenario (Table 2). The total cost to decommission is estimated to be $960.3 million in 2003 dollars. The NRC minimum decommissioning financial assurance requirement as reported in Reference 2 and set forth in 10 CFR 50.75(c) for PNP is approximately $327.2 million.

As of December 31, 2005, the PNP decommissioning trust fund balance was $544.1 million. As approved by Michigan Public Service Commission (MPSC), this fund is being supplemented with annual contributions of approximately $5.5 million through the end of 2011. Adjustments to annual contributions amounts require Michigan Public Service Commission (MPSC) approval in rate proceedings. To the extent that the trust fund balance exceeds costs required for radiological decommissioning, trust fund monies, in conjunction with Consumers Energy operating revenues, will be used to pay for spent fuel management.

The following items are key costs estimates:

(1) The estimated cost to isolate the spent fuel pool and fuel handling systems is $9.6 million. This cost is based on spent fuel pool isolation costs at other decommissioning facilities and engineering judgment. This cost is considered part of the activities

Enclosure 1

necessary to maintain the spent fuel in a safe and controlled state both during the initial decommissioning activities and during the fuel cool-down period.

(2) Annual costs (excluding labor) of approximately $977,000 and $60,000 are used for operation and maintenance of the spent fuel pool and each ISFSI, respectively.

(3) Annual cost for spent fuel management in the ISFSI is estimated at approximately $6 million (Table 1, years 2033-2047). This cost is based on actual costs at decommissioned facilities, estimated costs for facilities similar to PNP, and engineering judgment. These costs would be incurred annually during the storage period.

(4) An average cost of $250,000 is used for labor to load/transport the spent fuel from the pool to the ISFSI pad, based on industry experience.

(5) The ISFSI Decontamination & Dismantling costs are estimated at $8.3 million.

The following schedule shows the fuel management costs as it relates to decommissioning periods for a SAFSTOR with dry storage scenario:

Period # [(a)]	Title	Cost 2003$ (thousands) [(b)]	Period Duration, Months
0/1	SAFSTOR Preparations (includes pre-shutdown early planning costs)	15,531	18.0
2	12.5 Year Dormancy Maintenance (includes spent fuel transfer to ISFSI)	160,398	150.0
3	Decommissioning Preparations	2,987	18.1
4	Delayed Decommissioning	8,232	49
5b	Site Restoration	3,707	19.5
5c	Post Decommissioning ISFSI Operations (annual average of approximately $6 million)	98,777	198.9
5d, e, f	ISFSI Decontamination & Site Restoration	8,318	6.0
	TOTALS[(c)]	297,950	459.5

[(a)] Figure 4.2, Decommissioning Timeline, TLG Services, Inc. Decommissioning Cost Study for Palisades Nuclear Plant. March 2004.
[(b)] Table C, TLG Services, Inc. Decommissioning Cost Study for Palisades Nuclear Plant. March 2004.
[(c)] Columns may not add due to rounding.

Enclosure 2

Palisades Nuclear Plant
Preliminary Decommissioning Cost Estimate

I. Introduction

This report presents a summary of the preliminary estimate of the cost to decommission Palisades Nuclear Plant (PNP), as required by 10CFR50.75(f)(2). This cost estimate is based on the "Decommissioning Cost Study for Palisades Nuclear Plant" conducted by TLG Services, Inc. and premised on the assumption that the plant permanently ceases to operate in March 2011. The estimate assumes the eventual removal of all contaminated and activated plant components and structural materials, such that the operating licenses may be terminated to permit unrestricted use of the site. Although Nuclear Management Company, LLC (NMC) is currently seeking license renewal for PNP, this cost estimate is being submitted based on the current operating license expiration date for PNP. If license renewal for PNP is granted, this Preliminary Decommissioning Cost Estimate would no longer be applicable and a new estimate will be submitted in accordance with 10CFR50.75(f)(2).

II. Comparison of the Preliminary Cost Estimate to the Minimum Required Decommissioning Fund

The minimum decommissioning financial assurance requirement for PNP, as reported in Reference 2 and set forth in 10CFR50.75(c), is approximately $327.2 million. The total preliminary decommissioning cost estimate base on the "Decommissioning Cost Study" is approximately $960.3 million. This estimate includes approximately $584.1 million for decommissioning costs, $297.9 million for spent fuel management and $78.3 million for site restoration (Table 2).

III. Assessment of Major Factors That Could Affect Preliminary Cost Estimate

A. Decommissioning Option/Method

This Preliminary Decommissioning Cost Estimate assumes a SAFSTOR decommissioning option with dry storage of spent nuclear fuel. This estimate assumes PNP cessation of operation in March 2011 and a Department of Energy (DOE) spent fuel repository open in 2010. Interim storage of the fuel will be in the storage pool and/or an ISFSI located on the PNP site until the DOE assumed title to the spent fuel. The ISFSIs, which are independently licensed and operated, will accommodate the inventory of spent fuel residing in PNP's storage pool at the conclusion of the required cooling period. Once emptied, the Auxiliary Building will be prepared for long-term storage. Decommissioning of the ISFSIs will commence once DOE has accepted title to all PNP fuel. This cost estimate scenario includes the decontamination and dismantlement of the facility, spent fuel management and restoration of the site.

Enclosure 2

B. Potential for Known or Suspected Contamination

The Preliminary Decommissioning Cost Estimate does not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

C. LLW Disposition Plan

Low Level (Radioactive) Waste (LLW) disposal costs include processing, packaging, shipping, and burial/vendor costs. Palisades currently has access to the disposal facility in Barnwell, South Carolina; however, future use of this facility is likely to be limited. This Preliminary Decommissioning Cost Estimate assumes that additional disposal capacity will be available to support reactor decommissioning, particularly for the isolation of the more highly radioactive material. Therefore, for estimating purposes, waste disposal costs were generated using available pricing schedules for the currently operating facilities, i.e., at Barnwell in South Carolina and the Envirocare facility in Utah. Due to the high cost per cubic foot of LLW disposal, decontamination, recycling, conditioning and metal processing were incorporated into the decommissioning cost calculations in order to reduce the overall LLW disposal costs.

D. Preliminary Schedule of Decommissioning Activities

A schedule of the decommissioning scenario is illustrated in Table 2. Activity and period-dependent costs are estimated for each of the 5 decommissioning time periods, post-decommissioning ISFSI operation, and ISFSI decontamination and decommissioning. These time periods are briefly described in Section IV, below.

E. Other Factors That Could Significantly Affect the Cost to Decommission

NMC is currently unaware of any major site-specific factors that could have a significant effect on the cost of decommissioning. In order to anticipate unknown or unplanned occurrences during decommissioning, e.g. tool breakage, accidents, illnesses, weather delays, and labor stoppages, contingencies are applied to the cost estimates. Contingencies are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook" as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The amount of contingency depends on the status of design, procurement and construction; and the complexity and uncertainties within the defined project scope. The "Decommissioning Cost Study" conducted by TLG Services, Inc, examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. The composite contingency value calculated for the PNP SAFSTOR alternative is 20.37%. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

Enclosure 2

IV. Preliminary Cost Estimate Considerations

The Preliminary Decommissioning Cost Estimate is based on costs associated with the entire decommissioning work scope, including those activities related to the following periods of the decommissioning project: (0/1) SAFSTOR Preparations, (2) Dormancy, (3) Decommissioning Preparations, (4) Decommissioning Operations and (5) Site Restoration. The cost estimate also includes ISFSIs operating and decommissioning costs. The scope of each of those activities is described below. Disposition of LLW is also accounted for in the Preliminary Decommissioning Cost Estimate, as described in Section III.C, above.

A summary of activities and time duration for each SAFSTOR period follows (see Table 2 for cost estimates for each period):

(0/1) SAFSTOR Preparations: Includes preliminary engineering and planning to permanently de-fuel the reactor, revision of technical specifications applicable to operating conditions and requirements, a characterization of the facility and major components, and the development of the Post-Shutdown Decommissioning Activities Report (PSDAR). This period includes activities including, but not limited to, transfer of the spent fuel to the ISFSI, draining and de-energizing of non-contaminated systems, disposal of contaminated filter elements and resin beds, decontamination of the reactor coolant system, draining of the reactor vessel, preparing lighting, alarm, and security systems, and performing radiation surveys. Period duration is estimated at 18 months.

(2) Dormancy: Includes 24-hour security and surveillance, preventative and corrective maintenance of security systems, area lighting, buildings, heating and ventilation, routine radiological and environmental surveillance programs, and maintenance of structural integrity. Transfer of remaining spent fuel in the spent fuel pool to the ISFSI. Shipments of spent fuel from the ISFSI to the DOE should begin and occur throughout this period. Period duration is estimated at 150 months.

(3) Decommissioning Preparations: Includes reactivation of site services, engineering and planning, a detailed site characterization, the assembly of a decommissioning management organization, specification of transport and disposal requirements for activated and/or hazardous materials, final planning for decommissioning activities and the writing of activity specifications and detailed procedures. Period duration is estimated at 18.1 months.

(4) Decommissioning Operations: Includes physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful termination of the 10CFR50 operating license. Period duration is estimated at 49 months.

(5) Site Restoration: Includes activities required to remove contaminated materials and verify that residual radionuclide concentrations are below NRC limits. This will include prompt removal of site structures, removal of foundations and exterior walls to a nominal depth of three feet below grade, and fill and grading of the site. Period duration is estimated at 19.5 months.

Enclosure 2

ISFSI Operations and Decommissioning: The ISFSIs will continue to operate under a separate and independent license following the termination of the 10CFR50 license. At the conclusion of spent fuel operations, each ISFSI will be decommissioned. Once the canisters are removed, the modules will be dismantled, the storage pad removed, and the area will be graded and landscaped. Period duration is estimated at 204.9 months.

V. Plans for Adjusting Levels of Funding

NMC submitted a sufficient application for renewal of an operating license (Reference 1) and therefore, in accordance with 10 CFR 2.109, "Effect of Timely Renewal Application," "the existing license will not be deemed to have expired until the application has been finally determined." Although NMC is seeking license renewal, the Preliminary Decommissioning Cost Estimate is submitted based on the current operating license expiration date for PNP—March 24, 2011. If license renewal for Palisades is granted, the Preliminary Decommissioning Cost Estimate would no longer be applicable and a new plan and cost estimate will be submitted in accordance with 10 CFR 50.75(f)(2).

The cost to decommission PNP is estimated to be $960.3 million in 2003 dollars. The "Decommissioning Cost Study" for PNP developed by TLG Services, Inc. included cost estimates of approximately $584.1 million for decommissioning costs, $297.9 million for spent fuel management and $78.3 million for site restoration using a SAFSTOR scenario. The total estimated decommissioning costs by period and decommissioning activity are provided in Tables 1 and 2.

The NRC minimum decommissioning financial assurance requirement for PNP as reported in Reference 2 and set forth in10CFR50.75(c) is approximately $327.2 million. As of December 31, 2005, the PNP decommissioning trust fund balance was $544.1 million.

Consumers Energy applies reasonable earnings rates to the decommissioning funds throughout the decommissioning periods described above. In addition, the Preliminary Decommissioning Cost Estimate includes reasonable escalation factors for the decommissioning activities. Based on a cash flow analysis for the decommissioning activities to be performed for the periods described above, NMC believes that there is reasonable assurance that adequate decommissioning funds will be available to decommission PNP as described herein (assuming a 2011 shutdown). Consumers Energy plans to review the decommissioning fund status on a regular basis as described above.

Table 1 [a]
PNP Schedule of Annual Expenditures: SAFSTOR Scenario
(Thousands, 2003 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2008	0	0	0	0	8,698	8,698
2009	0	0	0	0	0	0
2010	0	0	0	0	0	0
2011	31,770	4,089	951	1,395	14,531	52,736
2012	31,337	5,504	1,103	1,253	12,854	52,051
2013	11,754	67	905	29	15,330	28,086
2014	11,754	67	905	29	15,330	28,086
2015	11,754	67	905	29	15,330	28,086
2016	11,786	67	908	29	15,372	28,163
2017	11,754	67	905	29	15,330	28,086
2018	11,754	67	905	29	15,330	28,086
2019	6,037	67	439	29	8,280	14,852
2020	2,767	67	172	29	4,251	7,286
2021	2,760	67	171	29	4,239	7,266
2022	2,760	67	171	29	4,239	7,266
2023	2,760	67	171	29	4,239	7,266
2024	2,767	67	172	29	4,251	7,286
2025	33,132	460	751	29	8,467	42,840
2026	47,846	19,175	896	13,849	17,353	99,119
2027	48,137	18,246	873	25,880	8,247	101,384
2028	45,222	4,710	686	20,784	6,547	77,950
2029	45,099	4,697	684	20,727	6,530	77,737
2030	18,915	2,255	282	1,157	12,902	35,512
2031	23,616	7,190	171	0	17,358	48,336
2032	10,958	3,053	107	0	9,858	23,977
2033	1,608	0	60	0	4,301	5,969
2034	1,608	0	60	0	4,301	5,969
2035	1,608	0	60	0	4,301	5,969
2036	1,612	0	60	0	4,313	5,985
2037	1,608	0	60	0	4,301	5,969
2038	1,608	0	60	0	4,301	5,969
2039	1,608	0	60	0	4,301	5,969
2040	1,612	0	60	0	4,313	5,985
2041	1,608	0	60	0	4,301	5,969
2042	1,608	0	60	0	4,301	5,969
2043	1,608	0	60	0	4,301	5,969
2044	1,612	0	60	0	4,313	5,985
2045	1,608	0	60	0	4,301	5,969
2046	1,608	0	60	0	4,301	5,969
2047	1,608	0	60	0	4,301	5,969
2048	1,624	705	60	22	20,023	22,434
2049	2,490	1,027	0	2,590	2,048	8,155
[b]	**454,688**	**71,920**	**14,198**	**88,027**	**331,491**	**960,325**

Table 2 [a]
PNP Summary of SAFSTOR Cost Estimate by Period Cost and Activity Cost
(Thousands, 2003 dollars)

	Total Contingency	Total Costs	NRC License Term Costs	Spent Fuel Management Costs	Site Restoration Costs
Period 0: Pre-Shutdown Early Planning	305	8,698	0	8,698	0
Period 1: Transition & Preparations	13,855	96,323	89,490	6,833	0
Period 2: Dormancy	22,478	229,730	69,332	160,398	0
Period 3: Preparations	14,756	110,217	106,256	2,987	974
Period 4: Decommissioning Operations	50,131	312,938	299,777	8,232	4,929
Period 5: Site Restoration, ISFSI Operations and D&D	9,609	78,794	2,678	3,707	72,409
Post-Decommissioning ISFSI Operations	50,237	115,308	16,531	98,777	0
ISFSI Decontamination & Decommissioning [b]	1,156	8,318	0	8,318	0
	162,527	**960,325**	**584,064**	**297,948**	**78,312**

[a] TLG Services, Inc. Decommissioning Cost Study for Palisades Nuclear Plant. March 2004.
[b] Columns may not add due to rounding.

AFFIRMATION ITEM

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Allison M. Macfarlane

SUBJECT: SECY-14-0072 – FINAL RULE: CONTINUED STORAGE OF SPENT NUCLEAR FUEL (RIN 3150-AJ20)

Approved X **Disapproved** X **Abstain** _____

Not Participating _____

COMMENTS: Below ___ Attached X None ___

SIGNATURE

8/7/2014
DATE

Entered on "STARS" Yes X **No** ___

Chairman Macfarlane's Comments on SECY-14-0072
"Proposed Rule: Continued Storage of Spent Nuclear Fuel"

Introduction

I approve publishing the rule for the Continued Storage of Spent Nuclear Fuel, subject to the following comments and edits to the *Federal Register* Notice (FRN) and the final Generic Environmental Impact Statement for continued storage of spent nuclear fuel (GEIS). I do not approve publishing the GEIS without addressing the potential range of environmental impacts for indefinite storage, with and without institutional controls.

Under consideration is a rulemaking regarding the environmental impacts of continued storage of spent nuclear fuel *beyond* the licensed life of nuclear power reactor operations.[1] This is a departure from a "Waste Confidence Decision" by the Commission, which historically included a set of findings about the availability of a mined geologic repository and the safe management of spent nuclear fuel in the interim. The staff has by contrast prepared the GEIS for Commission consideration.[2] The GEIS addresses the environmental impacts of continued above ground storage and provides a regulatory basis for completing this rulemaking. The GEIS also documents the results of extensive engagement with the public on the matter and accounts for the feedback we received.

An important backdrop to the Commission's decision on this matter is how to make a determination about the environmental impacts of on-site storage of spent nuclear fuel until a repository is sited and constructed at an unknown time in the future – while not inadvertently enabling the continued postponement of efforts to secure a geologic disposal solution. In essence, the GEIS concludes that unavoidable adverse environmental impacts are "small" for short-term, long-term, and indefinite time frames for storage of spent nuclear fuel. The proverbial "elephant in the room" is this: if the environmental impacts of storing waste indefinitely on the surface are essentially small, then is it necessary to have a deep geologic disposal option?

Deep geologic disposal is necessary. A majority of the public, industry, academia, and regulators agree on the need for geologic storage. Their reasoning is based on a number of factors: intergenerational equity, safety risks posed by unmonitored spent fuel, the high costs of indefinite storage, and the potential security and proliferation risks posed by lower activity spent fuel. However, siting and operating a repository is challenging, politically and technically. I believe it is essential to account for the broader context of national policy related to the management and disposition of spent nuclear fuel. In short, the U.S. government has yet to meet its own long-established responsibility to site a repository for the permanent disposal of spent nuclear fuel, contrary to the hopes expressed in previous Waste Confidence decisions. I want to ensure that the NRC, through its own policymaking, does not tip the balance in the direction of avoiding this necessary task.

---

[1] This rule is not applicable to the assessment of environmental impacts of spent fuel storage that occur during a reactor's licensed life for operation.

[2] The requirement to complete an environmental impact statement for major federal actions was established by the National Environmental Policy Act (NEPA) to promote informed decision-making by federal agencies and to ensure that information about potential environmental impacts of a pending federal action are available to both agency leadership and the public.

Therefore, my vote last year on the draft "Waste Confidence" rule continues to underpin my review of this final rule.[3] I am pleased that staff has addressed my belief that the Commission should not make a finding regarding the feasibility of repository availability as Commission policy. Staff is instead recommending that the Commission remove "waste confidence" from the lexicon and not include findings regarding repository availability in the final rule. I also objected to the assumption that institutional controls, the ability of the state to assure the safety and security of spent fuel, would continue indefinitely. I appreciate the staff's expanded discussion on institutional controls in Appendix B.3.4 of the GEIS, including the potential environmental impacts of both a temporary and a permanent loss of control. I still believe, however, that the GEIS needs to fully analyze the potential range of environmental impacts for indefinite storage, with and without institutional controls.

Lastly, I compliment our technical and legal staff for their work to complete this complex task on schedule. The Commission's charge to the staff demanded broad-based engagement with the public and extensive internal debate and deliberation. I am particularly appreciative of the staff's openness to consider the range of perspectives offered by the public and the Commission during this undertaking.

Repository Availability and Safe Storage

Consistent with my previous vote, I support the approach to discontinue a Commission policy decision on predicting the timing of a repository. The Commission's original policy was that it "would not continue to license reactors if it did not have reasonable confidence that wastes can and will be in 'due course' be disposed of safely." The resultant Waste Confidence Decision had historically been a set of five generic findings that consisted of two key ingredients: (1) affirmation that spent fuel can be safely stored for a certain period of time, and (2) affirmation that a repository to permanently dispose the spent fuel would be available within that timeframe. The first ingredient has been proven true thus far with experience. The second has not.[4] The timing of a repository is based on policy decisions and societal factors that are beyond the authority and control of the Commission.

Given the current progress being made in some countries and the U.S. experience with – and lessons learned from the operation of – the Waste Isolation Pilot Project, I have reasonable confidence that a deep geologic repository can be designed, authorized, constructed, and opened to accept waste for permanent disposal.[5] But there is not convincing evidence that a repository will be available in a "due course" of time given the nation's legislative and executive branch policy impasse. I will have confidence in the timing when a renewed national consensus emerges on a repository for spent nuclear fuel. In this context, however, I do not agree with certain supporting statements in the FRN and GEIS that seem to subtly affirm Commission conclusions that a repository will be available in the near-term (presumably by the middle of this century) as the "most likely scenario." These statements may be viewed as Commission policy and have no significant bearing on the environmental impact findings in the GEIS.[6] Therefore,

[3] Chairman Macfarlane's Comments on SECY-13-0061, "Proposed Rule: Waste Confidence - Continued Storage of Spent Nuclear Fuel," July 12, 2013. Available at http://pbadupws.nrc.gov/docs/ML1321/ML13217A261.pdf
[4] The original Waste Confidence Decision (1984), which set precedent on the structure of the Commission's approach, had determined that a repository would be available by 2009.
[5] Sweden, Finland, and France have selected repository sites already and Canada is making significant progress.
[6] It is important to note that both the plans of the current Administration to establish a repository by 2048, and the plans of the previous Administration to license and operate Yucca Mountain, would continue to be dependent on

the staff should revise statements in the GEIS and FRN to characterize repository availability in the near-term as "one reasonable scenario" rather than the "most likely scenario."

Institutional Controls During Indefinite Storage

Again, consistent with my previous vote, I do not fully approve the final GEIS without a formal analysis of indefinite storage to fully address a loss of institutional controls as one scenario. While I acknowledge that NEPA does not require consideration of worst case scenarios, I find that this is a unique and unprecedented review: the task of examining the impacts of indefinitely storing spent fuel on the surface without a repository – which would require millennia of active human oversight. Other power industries (e.g., coal or gas) may not be required to predict and disclose the indefinite impacts of their waste products (e.g., carbon pollution, heavy metals in coal ash) with the same rigor as considered here in this GEIS.[7] But we must.

Based on comments received on the draft GEIS, the staff has provided a discussion of the loss of institutional controls (see Appendix B.3.4). The staff recognizes some relevant analyses and literature, including the environmental impact statement for Yucca Mountain that analyzes environmental consequences of a storage alternative assuming loss of institutional controls.[8] The staff also notes the difficulty in reasonably foreseeing loss of institutional control scenarios and in predicting future consequences. The staff maintains that the most reasonably foreseeable assumption is that institutional controls will continue indefinitely, claiming in part that it would be illogical for any government to abandon the storage facilities given the significant hazards posed by spent fuel. Nonetheless, the staff concludes that a temporary loss of control would have impacts similar to spent fuel storage accidents and that a permanent loss of institutional controls would be a "catastrophe to the environment." These impacts "across nearly all resource areas would be clearly noticeable and destabilizing to the environment."[9]

In its remand, the Court "focused on the effects of failure to secure permanent storage."[10] Current institutional controls have already stalled in the U.S., in the sense that permanent disposal of spent fuel in a deep geologic repository is in itself a primary institutional control that was designated by Congress to permanently isolate long-lived radionuclides from the environment and human population. The court's remand was based on the federal government's failure thus far to implement the primary institutional control of permanent

---

approvals and long-term commitment from future Congresses and Administrations (e.g., authorizations, appropriations).

[7] The staff in fact may need to consider indefinite or irreversible impacts of these technologies when implementing the GEIS and comparing alternate power replacement sources in site-specific EIS for reactors.

[8] U.S. Department of Energy, "Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada." DOE EIS-0250F-S1, Office Civilian Radioactive Waste Management, Las Vegas, Nevada, 2008.

National Academy of Sciences "*Technical Bases for Yucca Mountain Standards,"* National Academy of Sciences / National Research Council of Board on Radioactive Waste Management, Committee on the Remediation of Buried and Tank Waste, National Academy Press, Washington, D.C., 1995.

National Academy of Sciences, "*Long-Term Institutional Management of the U.S. Department of Energy Legacy Waste Sites,"* National Academy of Sciences/National Research Council of Board on Radioactive Waste Management, Committee on the Remediation of Buried and Tank Waste, National Academy Press, Washington, D.C., 2000

[9] "Clearly noticeable and destabilizing" impacts are associated with LARGE environmental impacts as defined in Section 1.8.5 of the GEIS.

[10] *New York v. NRC*, 681, F.3d 471, 479 (D.C. Cir. 2012).

isolation. On this basis alone it is reasonable to question whether political and societal willingness to maintain obvious institutional controls will continue forever. Objectively, there are significant uncertainties such as (1) the lack of experience in repeatedly repackaging spent fuel into new storage devices over time, (2) the lack of a guarantee that responsible parties would pay for the costs of repackaging over time, and (3) unforeseen events in our natural environment and society. These all pose challenges to the assumption that indefinite institutional controls is the only scenario to consider in the resource impact assessments of the GEIS.

In my view, a thorough and complete analysis would have refined and expanded the assumptions made in the DOE analysis and analyzed the impact of radionuclides on the local environment that would occur if the barriers maintained by institutional controls failed.[11] I believe the agency should present a complete analysis of indefinite storage, including the full range of potential impacts from the worst case scenario. I disagree in part with the staff's views about the difficulty of quantitatively measuring impact, and believe it is relatively straightforward to calculate bounding impacts of indefinite storage. There is no need, however, to hypothesize which institutions will exist hundreds of years from now, or imagine what a future society would be like. I agree with staff that these are impossible tasks. We should only put forward what we can know with some certainty: if the casks containing the spent fuel and the fuel cladding were to fail, we can still calculate the concentrations of radionuclides at a given time. We can then qualitatively argue, underpinned by this factual analysis, that the impacts on the environment, surrounding soils, air, surface and ground waters would be LARGE.

I therefore maintain the position that the staff should fully evaluate the potential range of environmental impacts for indefinite, no-repository storage under two scenarios – keeping and losing institutional controls. Chapters 4 and 5 of the GEIS should be updated to systematically examine indefinite storage in the major resource areas that would be affected by uncontrolled releases from loss of institutional controls. Factually stating these impacts is transparent, stays closest to using assumptions based on factual data, and best conveys the potential range of environmental and societal consequences of generating spent nuclear fuel and failing to dispose of it in a repository – regardless of how unthinkable, remote, or speculative it may deemed to be today.

Spent Fuel Management Funds and Storage Costs (An Institutional Control Issue)

In the GEIS, the staff estimate that costs for activities related to onsite spent fuel storage, away-from reactor storage, periodic replacement of casks, and/or the use of dry transfer systems could reach hundreds of millions to billions of (2014) dollars for each site during a hundred-year lifetime (e.g., long-term scenario). They also note the Standard Contract of 10 CFR Part 961 requires the federal government to take title to and dispose of spent fuel, and numerous successful lawsuits filed by licensees have resulted in payments from the Judgment Fund for partial breaches of the Standard Contract.[12]

---

[11] An underlying assumption of the impacts in the GEIS is that as long as the spent fuel remains sealed and isolated in a dry storage cask, there will be no significant exposures to the natural environment and humans that surround the cask.

[12] The NRC staff acknowledges that, because of delays in the siting and licensing of a repository, the federal government bears an increasing share of the financial responsibility for storage costs. Although the annual costs for continued storage are manageable, cumulative costs will be large. The staff references a GAO report that indicates that the federal government has estimated it will pay a total of approximately $20 billion in damage awards and

To ensure safety and security at spent fuel storage sites, NRC requires that licensees have sufficient financial resources (e.g., revenue, trust funds) to maintain spent fuel management operations. In the GEIS, the staff points to spent fuel management funding requirements as the mechanism to ensure decommissioned licensees have these resources. This system and processes suffice over the short term. The question remains as to how to assure funding over the long-term and indefinite storage scenarios.

The business plan for nuclear power reactor licensees has been that the federal government would assume ownership of spent fuel under the Standard Contract, and would cover any additional costs. Decommissioned licensees will likely not have sufficient revenue to pay for the reoccurring expenses such as repackaging of spent fuel, construction of dry transfer facilities, and increased security needs assumed in the GEIS. As spent fuel ages, its radioactivity decreases, and hence it loses its self-protecting qualities that increase vulnerability to theft. As a result, security requirements for storage facilities will increase over time. It is only logical that the federal government would have to step in at some point to directly finance indefinite storage; or licensees would have to rely upon favorable judgments from the courts to reimburse them indefinitely for continued storage costs. While funding near-term storage is not a crisis, the staff should revise the GEIS and associated comments in Appendix D to reflect the genuine reality that the U.S. government will have to pay for the long-term storage of spent fuel.[13]

Site-specific Environmental Issues

The NRC received numerous public comments on the use of a generic analysis that would represent the environmental impacts for each location in the U.S. where storage of commercial spent nuclear fuel may continue. As discussed in question A5 of the Federal Register Notice (FRN), the NRC staff determined that the impacts of continued storage will not vary significantly across sites, despite variations in site-specific characteristics. Some commenters still questioned whether the generic analysis can adequately account for site-specific conditions and unique attributes surrounding each facility. Some commenters also expressed concern that the GEIS would preclude a site-specific evaluation of spent fuel storage where they live. I am receptive to some of these concerns, in particular, concerns that some power plant sites may have unique resources, liabilities, or other characteristics, such as location in a marine or wet environment, that influence environmental impacts. The staff assigns impact ranges to a few areas, such as historic and cultural resources. In addition, staff points out that each future site-specific storage application (in the continued storage phase) will have its own site-specific environmental analysis.[14] For purposes of this rulemaking, I believe a generic environmental impact statement (with a full understanding of indefinite storage as discussed above) is the best approach for establishing this rule. However, in implementing the GEIS findings into site-specific environmental analyses, the staff should develop approaches and procedures that are transparent to the public on how these impact ranges are considered for each specific site.

---

settlements by the year 2020 and $500 million per year after that, if DOE does not accept fuel by 2021 and spent fuel continues to accumulate at reactor sites.

[13] This substantial financial burden again underscores the importance of considering scenarios that cover the range of possibilities related to the impact of the loss of institutional controls over an indefinite timeframe.

[14] This could result in a conundrum if the licensee or NRC determines there is a significant safety or environmental issue during operations or in a future licensing proceeding – because the spent fuel has already been generated and exists at the site. Unlike reactor facilities, dry storage casks are passive systems that cannot immediately "cease operating." Dry storage casks must remain safe and secure until they are transferred to a regional storage or disposal facility.

I am also concerned about generic statements in the GEIS that could imply that all current reactor sites that enter the continued storage phase will be automatically subject to specific licensing actions and have site-specific environmental reviews. Storage under a site-specific license will result in a site-specific environmental review. However, the majority of current reactor licensees store spent fuel under their general license and use storage casks that are certified by NRC through rulemaking, based on generic NEPA assessments. These sites therefore do not have site-specific NEPA analyses. The staff should revise the response to question A10 of the FRN to clarify that appropriate site-specific NEPA analysis may not be conducted for continued storage until the end of the short term storage timeframe for general license storage.

Finally, I take note of the significant number of comments on spent fuel pool fire hazards. Some commented that the spent fuel pool fire risk depends on site-specific factors and cannot be assessed generically. Others disagree with the risk-based impact finding of SMALL, which results from the low probability assigned to spent fuel pool loss of water and fire events.[15] I have previously commented on spent fuel fire risks in regard to the need for optimizing spent fuel management at operating reactors with pools and dry cask storage.[16] One key objective of NEPA is full disclosure of potential environmental impacts so that decision makers can use this knowledge to inform decisions. In this regard, I approve the record of discussion in the GEIS: while deemed a very low probability, the potential consequences of a spent fuel fire could be significant and destabilizing to the environment (see Appendix F of the GEIS).

Periodic Re-examination of the GEIS and Rule

The GEIS should not be a one-time exercise. The GEIS that supports this continued storage rule contains a great level of specificity in its analyses and assumptions regarding long-term storage. These assumptions are based on the best-available information today. The GEIS will need to remain viable over the long-term. It underpins both the rule language in 10 CFR Part 51 and the way in which staff examines spent fuel storage impacts in site-specific NEPA reviews. There is also a significant amount of public interest with valuable input on this matter. The staff proposes that the Commission review the GEIS for possible revision when warranted by significant events that may call into question the appropriateness of the rule.

For effectiveness, openness, and in the spirit of public participation in the NEPA process, a periodic review of the GEIS is warranted. On a ten year periodic basis, the staff should examine the GEIS, including: (1) the fundamental assumptions that underpin the impact findings for all three storage scenarios, (2) changes in U.S. national policy or direction on long-term spent fuel

[15] NRC uses the terms SMALL, MODERATE, and LARGE to define the standard of significance in assessing environmental issues. SMALL environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter an important attribute of the resource. MODERATE environmental effects are sufficient to alter noticeably, but not to destabilize important attributes of the resource. LARGE environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource. For risk-based determinations, such as analyses of spent fuel pool fires, the probability of occurrence and potential consequences have been factored into the determination of significance.

[16] See Chairman Macfarlane comments on COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel," April 8, 2014. Key elements of managing spent fuel fire risks is the thermal management of recently discharged fuel assemblies and reducing source terms in spent fuel pools. In this regard, I believe the risks for spent fuel fires in a pool during the continued storage period is generically lower than at operating plants. The decay heat significantly decreases after the first few years of reactor shutdown, thus making thermal management factors less relevant.

management, and (3) experience gained through licensing proceedings that implement the revised rule. Based on this formal examination, the staff should provide a recommendation on whether to supplement the GEIS or rule, if needed. To support this approach and identify implementation issues that may need more timely resolution, the staff on a periodic basis (e.g., every 3 years), should provide an information paper to the Commission that reports any significant events, major research activities, and licensing proceedings that have bearing on the rule and GEIS. The response to item A14 and other areas of the proposed rule should be revised accordingly to reflect this plan to periodically re-examine the GEIS and Rule.

Other Corrections to Final FRN and GEIS

In addition to the changes noted above, the staff should update the FRN and GEIS as shown in Attachments 1 and 2 of my vote, to reflect other important changes and clarifications.

Conclusion

I approve the general approach for assessing impacts in the short term and longer term storage scenarios, but I do not endorse the determination of impacts of indefinite storage of spent nuclear fuel without an additional scenario that accounts for the impact in each resource area of the potential loss of institutional controls. I believe a "worst case" estimate of potential environmental impacts is needed to fully inform decision makers about the entire range of potential environmental impacts of generating new spent fuel without a repository for permanent disposal.

In order to have a full and complete record of the potential range of environmental impacts of generating spent fuel without a deep geologic repository, the GEIS should fully examine indefinite storage with and without institutional controls. Further, I believe that a ten-year periodic review of the GEIS is warranted. On a three year basis, the staff should provide an information paper to the Commission that reports on any significant events, major research activities, and licensing proceedings that have bearing on the rule.

Finally, I note that at least one commenter has suggested that development of a repository in the U.S. has devolved into a Sisyphean task. I agree that much in the national management of spent fuel and development of a geologic repository over the past decades fits this analogy. I believe that it is essential that the Nuclear Regulatory Commission should not, through its own regulatory policy-making, inadvertently give impetus to policy makers to avoid the pursuit of a repository. There is a well-recognized, internationally-accepted finding, and long-standing national policy, that the only suitable end point for high-level nuclear waste is permanent isolation in a deep geologic repository. I remain firm in my belief that indefinite or even long-term surface storage is not the appropriate alternative to deep geologic disposal.

If nuclear power is going to be an essential element of our nation's base load power, particularly as a means to counter carbon-induced climate change, legislative and executive branch leaders must bear the responsibility to chart a path for final disposition of spent nuclear fuel.

8/7/2014

Allison M. Macfarlane Date

TAB 3

CHARLES G. LA BELLA (SBN 183448)
charles.labella@btlaw.com
ERIC BESTE (SBN 226089)
eric.beste@btlaw.com
ZACHARY P. HELLER (CA Admission pending)
zachary.heller@btlaw.com
BARNES & THORNBURG LLP
655 West Broadway, Suite 900
San Diego, California 92101
Telephone: 619.321.5000
Facsimile: 619.284.3894

RANDY GORDON
randy.gordon@btlaw.com
LUCAS C. WOHLFORD
lwohlford@btlaw.com
BARNES & THORNBURG LLP
2121 N. Pearl Street, Suite 700
Dallas, TX 75201
Telephone: 214.258.4148
Facsimile: 214.258.4199

Attorneys for Petitioner,
Public Watchdogs

UNITED STATES NUCLEAR REGULATORY COMMISSION

Before the Executive Director for Operations

PUBLIC WATCHDOGS, a California 501(c)(3) corporation, Petitioner, v. SOUTHERN CALIFORNIA EDISON COMPANY AND SAN DIEGO GAS & ELECTRIC COMPANY, Licensees.	**10 C.F.R. § 2.206 PETITION TO IMMEDIATELY SUSPEND DECOMMISSIONING OPERATIONS AT SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3**

Pursuant to 10 C.F.R. § 2.206, Petitioner Public Watchdogs ("Petitioner") hereby submits its Petition to Immediately Suspend Decommissioning Operations at San Onofre Nuclear Generating Station ("SONGS") Units 2 and 3:

PRELIMINARY STATEMENT

1. As part of the ongoing decommissioning of SONGS Units 2 and 3, Licensees Southern California Edison Company ("Edison") and San Diego Gas & Electric Company (collectively, "Licensees") are in the process of burying hundreds of tons of deadly spent nuclear fuel a mere 108 feet from one of California's most populated public beaches, within a tsunami zone surrounded by active fault lines, in canisters that are damaged, defective, and not properly designed to serve their intended purpose. Throughout the decommissioning process, the Nuclear Regulatory Commission ("NRC") has effectively turned a blind eye to multiple alarming safety hazards created by Licensees' burial of spent nuclear fuel at SONGS, including evidence that the canisters being used by Licensees are damaged and defective, and that Licensees do not have adequate safety procedures or competent staff to complete the transfer of the spent nuclear fuel from wet to dry storage.

2. What's more, the NRC's various actions permitting the implementation of Licensees' decommissioning plan and authorizing Licensees' dangerous burial of spent nuclear fuel at SONGS are based on unreasonable and fundamentally flawed assumptions that: (1) the United States Department of Energy ("DOE") will begin accepting spent nuclear fuel from nuclear generating stations like SONGS in 2024 or 2028; (2) all of the spent nuclear fuel currently being buried at SONGS will be permanently removed from the site by 2049; and (3) the SONGS site will be restored to a condition that is acceptable for unrestricted use by 2051. In fact, no central repository for permanent storage of spent nuclear fuel exists in the United States, there is no viable plan to open such a permanent repository, and the DOE undoubtedly will not begin accepting spent nuclear fuel for permanent storage from SONGS or any other nuclear generating station in 2024, 2028, or any other time in the foreseeable future. As the United States Court of Appeals for the District of Columbia Circuit has observed: "At this time, there is not even a prospective

site for a repository, let alone progress toward the actual construction of one." *New York v. Nuclear Regulatory Com'n*, 681 F.3d 471, 474 (D.C. Cir. 2012).

3. By ignoring the manifold safety hazards posed by Licensees' decommissioning operations and permitting Licensees to implement their decommissioning plan based on the unreasonable assumption that spent nuclear fuel will be stored at SONGS only temporarily, the NRC has abdicated its paramount responsibility to protect public health and safety and it has failed to ensure Licensees will have adequate funds to pay for the full cost of decommissioning and restoring the SONGS site through the termination of their license. Accordingly, Petitioners respectfully request that the NRC issue an order immediately suspending all decommissioning operations at SONGS, including the burial of spent nuclear fuel at the SONGS site, and requiring Licensees to submit an amended decommissioning plan that properly accounts for the reality that the spent nuclear fuel being buried at SONGS will remain there indefinitely.

FACTUAL BACKGROUND

I. LICENSEES' NEGLIGENT OPERATION OF SONGS

4. In August 1963, Congress enacted Public Law 88-82 authorizing the "construct[ion], operate[ion], maintain[enance], and use" of a nuclear power plant on approximately 90 acres of land located at the Camp Pendleton military base. In May 1964, the United States of America granted Licensees an easement for the sole purpose of "construction, operation, maintenance and use of a nuclear electric generating station" at the Camp Pendleton site.

5. Licensees operated three nuclear electric generating units at SONGS. Licensees operated Unit 1 from approximately 1968 until 1992, when they began the decommissioning process for that unit. Licensees operated Units 2 and 3 from approximately 1983 and 1984 (respectively) until June 12, 2013, when they submitted written certification to the NRC that they were permanently ceasing operation of those units.

6. Throughout its time as an operational nuclear power plant, SONGS was marred by numerous instances of poor safety and regulatory compliance, which ultimately contributed to the cessation of operations at the site. These compliance debacles included the backward installation of a 420-ton nuclear reactor vessel and the installation of replacement steam generators, without obtaining the requisite approval from the NRC, which ultimately malfunctioned and leaked deadly radioactive steam at the site.

II. LICENSEES' FUNDAMENTALLY FLAWED DECOMMISSIONING PLAN

7. On September 23, 2014, Licensees submitted their decommissioning plan to the NRC, including a Post-Shutdown Decommissioning Activities Report ("PSDAR"), an Irradiated Fuel Management Plan ("IFMP"), and a Site Specific Decommissioning Cost Estimate ("DCE"). *See* **Exhibits 1, 2, and 3.**

8. Licensees' PSDAR provided a general overview and timetable for the decommissioning, decontamination, restoration, and license termination activities at the SONGS site. The PSDAR specified that Licensees would begin transferring spent nuclear fuel to dry storage in the SONGS Independent Spent Fuel Storage Installation ("ISFSI") in 2014, and complete the transfer by June 2019. *See* **Exhibit 1**. Thereafter, Licensees proposed to store the spent nuclear fuel in the ISFSI during decommissioning from June 2019 to December 2031. *Id.* Finally, Licensees proposed to store spent nuclear fuel in the ISFSI during a post-decommissioning period from December 2031 to December 2049. *Id.* This timeline was based on the assumption that the DOE will begin accepting spent nuclear fuel from the industry in 2024, that all spent nuclear fuel will be permanently removed from the SONGS ISFSI and transferred to an off-site permanent repository by 2049, and that the SONGS site will be restored to a condition acceptable for unrestricted use and returned to the U.S. Navy by 2051. *Id.* Licensees expressly based this assumption on some unspecified "previously documented positions of the DOE, which indicates that shipments from the industry could begin as early as 2024 and SONGS place in the current queue." *Id.* Notably, however, Licensees acknowledged that both the date on which the

DOE would begin accepting spent nuclear fuel from the industry and SONGS place in the queue "are subject to change." *Id*.

9. Licensees' IFMP provides additional details regarding their strategy for storing, monitoring, and managing spent nuclear fuel at the SONGS ISFSI during and after the decommissioning period and through ultimate termination of the SONGS licenses. *See* **Exhibit 2**. Like the PSDAR, Licensees' IFMP is expressly based on the assumptions that the DOE would begin accepting spent nuclear fuel from the industry in 2024 and that all spent nuclear fuel would be permanently removed from the SONGS ISFSI by 2049. *Id.* Again, however, Licensees provided no objective evidentiary support for these critical assumptions.

10. Finally, Licensees' DCE provided a detailed estimate of the anticipated costs of the decommissioning and spent fuel management activities at SONGS. *See* **Exhibit 3**. Licensees projected that the total cost of decommissioning and restoring the SONGS site would exceed $4 billion, of which approximately $1.3 billion was allocated for spent fuel management through 2049. *Id*. Once again, Licensees based their DCE on the assumptions that the DOE will begin accepting spent nuclear fuel from the industry in 2024 and that all spent nuclear fuel will be removed from the SONGS ISFSI by 2049. *Id*. Significantly, however, Licensees' DCE expressly acknowledged that "DOE has not committed to accept [Edison's] canistered spent fuel." *Id*. Despite this acknowledgment, the DCE also confusingly stated: "But for purposes of this estimate, it is assumed that an [Edison-funded] dry storage facility will not be necessary." *Id.*

11. At the time Licensees submitted their PSDAR, IFMP, and DCE, there was, in fact, no viable plan or intention for the DOE to begin accepting spent nuclear fuel in 2024 or any other time. Indeed, Licensees submitted their PSDAR, IFMP, and DCE approximately 4 years after the DOE withdrew its application for a license to construct a permanent repository for spent nuclear fuel at Yucca Mountain in Nevada and approximately 3 years after the NRC suspended its adjudicatory proceeding regarding the withdrawal of the DOE's license application. *See* **Exhibit 4**. In other words, the

fundamental predicate for Licensees' decommissioning plan was, and remains today, a pure fiction that is completely untethered to objective reality.

III. LICENSEES' SELECTION OF HOLTEC'S HI-STORM UMAX STORAGE SYSTEM AND DEFECTIVE THIN-WALL CANISTERS

12. At the time Licensees submitted their decommissioning plan, they had not yet identified a location for the expanded SONGS ISFSI, nor had they selected storage equipment or vendors for the build out of the ISFSI. *See* **Exhibit 2**.

13. In December 2014, Licensees selected a location for the expanded SONGS ISFSI and selected Holtec International's ("Holtec") HI-STORM UMAX storage system for the "temporary" storage of spent nuclear fuel. *See* **Exhibit 5**. The location selected for the ISFSI is a mere 108 feet from the Pacific Ocean, within a tsunami zone surrounded by active fault lines, and little more than a foot above the mean high tide level, making it especially susceptible to flooding as sea levels rise. *See* **Exhibit 6**. Notably, although Licensees' decommissioning plan contemplated, albeit fancifully, that spent nuclear fuel would be stored at the SONGS ISFSI for at least 30 years, Holtec only warranted its storage system for 10 years. *See* **Exhibit 7**.

14. Moreover, the Holtec dry storage canisters in which the spent nuclear fuel is being stored at the SONGS ISFSI are defective and unfit for the indefinite storage of spent nuclear fuel. Each and every one of the 73 individual canisters will contain more deadly radioactive Cesium-137 than was released globally during the Chernobyl disaster, as well as dozens of other radioactive and toxic fission byproducts. The failure of even one of these canisters will have calamitous consequences. Severe problems with Licensees' decommissioning plan make this nightmare scenario a real possibility.

15. First, although the radioisotopes in each canister remain radioactive, toxic, and deadly for hundreds of years (and one, Plutonium-239, remains deadly for over 24,000 years), Holtec warrants the canisters for only 25 years. *See* **Exhibit 7**. Thus, the warranty on the canisters will expire long before 2049, when Licensees unreasonably assume that all spent fuel will be transferred to permanent storage, and there is no objective basis for

determining that the canisters will remain viable beyond 2049, even though they will likely remain in the SONGS ISFSI indefinitely.

16. Second, the design of the Holtec canisters the Licensees are using to store the spent nuclear fuel deviates from the acceptable minimum safety thresholds required for the design and manufacture of nuclear waste storage containers. Indeed, the Holtec canisters are so-called "thin-wall" canisters with only a 5/8-inch thick stainless-steel wall with an aluminum egg-crate structure designed to hold up to 37 spent fuel assemblies. Holtec designs, manufactures, and supplies the canisters under strict guidelines promulgated by the NRC and, more important, under the conditions of applicable certificates of compliance ("CoCs"). *See* **Exhibit 8**. The NRC issues a CoC conditioned on the holder strictly hewing to specific technical specifications and approved contents and design features. But after receiving CoCs for the thin-wall canisters being used at SONGS, Holtec secretly modified the design and manufacture of the canisters, apparently to reduce manufacturing costs and/or to correct a flaw in the original design. By making the change surreptitiously, Holtec avoided a costly and time-consuming NRC design review and attendant risk analysis. In any case, the design change introduced a critical flaw into the casks that is discussed in further detail below.

17. Third, due to the design of the canisters, the narrow slots in which they are loaded into the storage system, and the equipment used to load the canisters into the storage system, extensive gouging of the canisters occurs during routine loading into the storage system. Over time, the gouges in the canisters can grow into deeper cracks that make the canisters susceptible to leaking and make it impossible for the canisters to be safely removed from the ISFSI in the future. However, there is no way to adequately monitor or inspect the canisters once they are in the ground, and no way to fix them even if critical damage to them could be identified.

IV. NRC GRANTS A LICENSE AMENDMENT THAT PERMITS DECOMMISSIONING OF SONGS ACCORDING TO LICENSEES' FLAWED DECOMMISSIONING PLAN

18. Because the original license granted to the Licensees was narrow in scope—in that it only permitted them to operate the plant and temporarily store spent nuclear fuel and waste—a license amendment would be necessary to decommission the plant. However, when Licensees decided to permanently cease nuclear operations, they sought to utilize the nuclear power plant for an entirely different purpose—that is, the long-term storage of spent nuclear fuel. Thus, the grant or denial of the Licensees' request for a license amendment was a matter of significant public concern, requiring an opportunity for meaningful public participation.

19. Without meaningful public participation or an independent assessment, on July 17, 2015, the NRC granted Licensees' request for a license amendment that permitted them to begin decommissioning the SONGS facility. *See* **Exhibit 9**. Specifically, the NRC authorized Licensees to "Take actions necessary to decommission the plant and continue to maintain the facility, including, where applicable, the storage, control and maintenance of the spent fuel, in a safe condition." *Id*. In so doing, the NRC "found" that there was "reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations." *Id*. In fact, the NRC simply relied on Licensees' own flawed analysis instead of objective criteria or independent analysis, enabling Licensees to present their internal, untested, and unchecked conclusions, without even a suggestion of an objective analysis or oversight.

20. In addition, the NRC repeatedly granted Licensees' numerous subsequent license amendments and exemptions, regardless of the scope and magnitude of the proposed changes. *See* **Exhibit 10**. Among these exemptions was a staggering reduction in the amount of onsite liability insurance required to be maintained by Licensees from the $1.06 billion required by NRC regulations to a paltry $50 million. *See* **Exhibit 11**.

V. LICENSEES' MULTIPLE DECOMMISSIONING DISASTERS

21. From the outset, Licensees' decommissioning operations have been marred by a series of miscues, lackadaisical managerial oversight, and attempts to conceal the same. Unsurprisingly, this behavior has caused Licensees to repeatedly fall short of the NRC's identified standards and promulgated regulations. Among the many failures of the Licensees' decommissioning efforts are the following:

A. Licensees compromised the structural integrity of twenty-nine canisters they buried at SONGS.

22. Licensees have consistently used fewer personnel than necessary to ensure that the Holtec canisters are safely and effectively loaded into the ISFSI. For example, Licensees have employed an inadequate number of "spotters" at different vantage points, resulting in limited visibility of the canister as it is being loaded into its enclosure. This negligent deviation from safe fuel-handling procedures has already caused substantial harm to the millions of people around the SONGS facility. *See* **Exhibit 12**.

23. On information and belief, and as revealed in NRC documents and noted at public hearings, the Licensees negligently gouged and then buried twenty-nine (29) fully loaded canisters at SONGS. Experts believe this gouging may lead to deeper, through-the-wall cracks, which will make the future safe movement of these canisters impossible (despite the fact that the safety of the canisters' storage location is only warranted for 10 years). Experts also point out that damage to the canisters will be exacerbated, *inter alia*, by the presence of salt air, fog, rain, and salt water—the precise weather conditions that the canisters will be exposed to at the current location just steps from the Pacific Ocean. *See* **Exhibit 6**.

24. Upon information and belief, many (if not all) of the canisters were negligently scratched during transportation to the ISFSI. According to an NRC inspection report, and as admitted at a Community Engagement Panel Meeting by NRC spokesperson Scott Morris, **every single canister was damaged** during the downloading process: "The canister involved in the near-drop event [and] all the other canisters . . . experienced a little

bit of scuffing, and a little bit of contact going into the ISFSI." *See* **Exhibit 13**. As discussed below, one NRC inspector concluded that the damage to the canisters during loading into the SONGS ISFSI caused them to fall out of compliance with requirements of the applicable CoC. *See* **Exhibits 27 and 29**. The NRC, however, simply ignored this assessment and cleared the way for even more defective and non-compliant canisters to be buried at SONGS.[1]

B. Licensees nearly dropped two 49-ton canisters full of deadly radioactive nuclear waste and attempted to cover it up.

25. On July 22, 2018, Licensees nearly dropped a 49-ton canister full of deadly radioactive nuclear waste more than 18 feet into the ISFSI when it was caught on a quarter inch thick steel guide ring. Licensees referred to this event as an "unsecured load event." In actuality, this event could have turned San Onofre State Beach Park into a permanently uninhabitable nuclear wasteland.

26. Pursuant to 10 C.F.R. § 72.75, any incident involving nuclear waste ***must*** be reported to the NRC within ***twenty-four hours***, yet the July 22 failure was not formally reported on the NRC's Event Notifications Report. The sole purpose of 10 C.F.R. § 72.75 is to insure that potentially hazardous events are promptly reported and investigated and to allow for public disclosure of potential safety risks.

27. Despite the regulation's clear obligation to provide a formal written report for events of this nature, Licensees ***never*** provided a formal report for the July 22 unsecured load event. As a result, the public was kept in the dark about the potentially disastrous incident in July.

28. Ten days later, on August 3, 2018, the Licensees once again lost control of a 49-ton canister full of deadly radioactive nuclear waste while it was being lowered into a

[1] Despite the Licensees' efforts to downplay the significance of the gouging found on Holtec canisters, the potential consequences are staggering. Holtec's CEO admitted as much during a public meeting, acknowledging that even a microscopic crack in a canister is enough to cause a release of "millions of curies of radioactivity." *Dr. Kris Singh, CEO, Holtec International, on Dry Canister Nuclear Waste Storage*, YouTube (Oct. 14, 2014), at 31:04-34:30(at https://www.youtube.com/watch?v=s5LAQgTcvAU). *See* **Exhibit 14**.

below-ground storage silo. While moving the canister, Licensees' employees snagged the 49-ton canister on the same quarter-inch wide steel flange that captured the canister during the July 22 event. Licensees' personnel did not realize that the equipment holding the canister had been caught on the flange.

29. A whistleblower, David Fritch, came forward and publicly reported the event six days later during the August 9 Community Engagement Panel Meeting. Prior to the whistleblower's disclosure, Licensees' representative did not disclose the August 3 "near-miss" disaster when discussing the work stoppage put in place after the event. In fact, Edison's then Vice President and Chief Nuclear Officer, Tom Palmisano, affirmatively misled the public and misrepresented that the work stoppage was a planned stop so that they could perform necessary maintenance, provide employees with time off, and analyze the overall efficiency and effectiveness of the decommissioning process at that point.

30. However, during the public comment portion of the event, Fritch (a Safety Professional employed as a contractor at the SONGS facility) disclosed the misconduct as the actual cause for the work stoppage. Fritch informed the public about the near-miss event of August 3rd, and directly contradicted Licensees' public statements that the work stoppage was a "planned event."

31. Fritch's whistle-blowing sparked widespread media attention on the safety hazards posed by the Defendants' negligence at the facility. This alone should have prompted the NRC to perform a professional and independent risk assessment to determine the actual risks at the site, and take appropriate remedial steps to avoid or minimize future risks. Again, however, the NRC abdicated its responsibilities and continued to do nothing to protect the public or adequately monitor the situation.

32. As before, the Licensees failed to issue an NRC Event Notification Report within twenty-four hours of the Friday, August 3 event as required the NRC's regulations. Instead, they waited more than six weeks to report the incident. Moreover, rather than submitting the legally required written report, Licensees waited until Monday, August 6, to informally call the NRC. Licensees' private phone call deprived the public not only of

a written contemporaneous report of the near fatal disaster but prevented transparency of their actions at SONGS. This oral notification both failed to comply with the NRC's own "Event Reporting Requirements" under 10 CFR § 72.75, and failed to notify the public of the significant public safety hazards being posed by Licensees' decommissioning operations. In this way, Licensees attempted to keep the August 3 near-catastrophic-miss a secret.

33. This concealment was not accidental. In fact, the July 22 and August 3 near-miss events occurred during a required public comment period for the California State Lands Commissions Draft Environmental Impact Report ("EIR") directly related to the SONGS decommissioning project. That period ran from June 28 until August 30. By delaying formal written notice of the events, Licensees were able to avoid meaningful public participation in connection with the interrelated EIR.

34. Rather than taking precautionary steps to protect the public in light of the Licensees' demonstrated negligence, upon information and belief, the NRC completely deferred to Licensees and blindly relied upon their assurances that everything was under control. Indeed, the NRC went so far as to summarily reject a written request by Congressman Mike Levin for the installation of permanent NRC inspectors at the facility. *See* **Exhibit 15**.

35. On August 17, 2018, in response to the August 3 "near-miss," the NRC issued an Inspection Charter for SONGS, which found five violations that were ultimately penalized by the imposition of a wrist-slapping fee of $116,000 on Edison. *See* **Exhibits 16 and 17**. Perhaps more troubling, the NRC has not required Licensees to file an Event Notification Report for the July 22 event, and has ignored their flagrant violation of federal law for not filing an Event Notification Report for 47 days after the August 3 event.

36. Instead of ordering the Licensees to cease operations at SONGS, the NRC seemingly accepted the Licensees' "verbal commitment" to discontinue loading until the NRC issued its final Inspection Report.

VI. HOLTEC'S SURREPTITIOUS REDESIGN OF THE DRY STORAGE CANISTERS

37. In February 2018, while preparing to load one of the thin-wall canisters with spent nuclear fuel, Licensees discovered a loose bolt inside. After reporting the issue to Holtec, Holtec revealed that it had redesigned the already defective canisters to include a different "stand-off shim." The purpose of these shims is to enhance convection cooling of the hot fuel assemblies by creating additional space to allow cooling helium gas to flow throughout the canister so that the spent nuclear fuel does not overheat. The newly designed shims included bolts that were not part of the original design. As Licensees discovered, the newly introduced bolts are susceptible to breaking loose inside the canister, which could ultimately cause a restriction of airflow within the canister and a failure of the canister's cooling mechanism. Left uncooled, spent nuclear fuel will heat up to the point of a critical—and deadly—nuclear reaction. Thus, a failure of the canister's cooling mechanism would be disastrous.

38. Under NRC regulations, Holtec was required to obtain a CoC amendment prior to implementing any proposed change to the design of its canisters if the change would result in more than a minimal increase in the frequency or likelihood of an accident, malfunction, or the consequences of such accident or malfunction. Despite the serious risks posed by Holtec's design changes, however, Holtec failed to even notify the NRC, much less obtain a CoC amendment, before changing the design of the canisters.

39. On March 22, 2018, Licensees' admitted during a Community Engagement Panel Meeting that four canisters with the defective shim design had already been filled with spent nuclear fuel and buried at SONGS. To make matters worse, Mr. Palmisano made a stunning admission that there is no existing method for safely opening defectively designed canisters to see if the stand-off shims were broken in the four buried canisters. Thus, the SONGS Defendants have no way of ensuring that the fuel assemblies and/or cooling mechanisms have not been critically compromised. Mr. Palmisano admitted that

it would be at least three years before the techniques necessary to unload and inspect a canister ***could possibly*** be developed:

> So nobody has unloaded a commercial canister, either a bolted cask or a welded cask or canister. . . . What you would do is basically have a mechanism, either to do it in a fuel pool or do it in a dry transfer facility. . . . The real challenge as we would understand it today, and nobody has had to do it yet, is the reflood. Certainly, technically possible. What I would tell you is just I was back in Washington with the NRC last week, if you were just to brainstorm, ***this would probably be a two- to three-year project to develop the techniques***, pile up the techniques. The NRC would want to have explicit approval on this because of the ***radiological hazards***.

See **Exhibit 18** (emphasis added).

40. Although the NRC found that Holtec failed to establish adequate design control measures of components important to safety, and failed to perform evaluations before making the design changes, it failed to impose any fine or other penalty on Holtec for these violations.

41. Notably, this was not the first time Holtec flouted its obligations to disclose critical information to a regulator. In October 2010, Holtec was "debarred" as a contractor by the Tennessee Valley Authority ("TVA") in connection with improper and undisclosed payments made to a federal official to secure a contract to design and construct a dry cask storage system for spent nuclear fuel rods at the Brown Ferry Nuclear Plant. *See* **Exhibit 25**. Following that debarment, Holtec sought a $260 million tax break related to a nuclear plant project in Camden New Jersey. As part of that process, Holtec's CEO Kris Singh submitted certified forms where he answered "no" to the question of whether Holtec had ever been barred from doing business with a state or federal agency. In June 2019, New Jersey regulators froze Holtec's $260 million tax-incentive award pending further investigation. *See* **Exhibit 26**. Despite Holtec's history of misconduct and deceit, the NRC has continued to blindly accept its representations regarding its defective and dangerous canisters and has approved multiple amendments to the applicable CoCs to permit the continued use of Holtec's defective and dangerous canisters at SONGS and elsewhere.

VII. LICENSEES' UPDATED, BUT NO LESS FLAWED, DCE, AND DECOMMISSIONING FUNDING STATUS REPORTS

42. As required by the California Nuclear Facilities Decommissioning Act of 1985, Licensees updated their DCE for SONGS Units 2 & 3 in 2017. *See* **Exhibit 19**. Although Licensees' updated DCE continued to estimate that all spent nuclear fuel will be removed from the SONGS ISFSI by 2049, and that the site will be acceptable for unrestricted use by the end of 2051, Licensees changed their assumptions regarding the date the DOE will commence accepting spent nuclear fuel from the industry. Specifically, Licensees' 2017 DCE assumed the DOE will begin accepting spent nuclear fuel from the industry in 2028, rather than 2024, because of the "DOE's continued failure to perform its contractual obligation to remove spent fuel from commercial nuclear reactors in the past four years." Licensees' 2017 DCE does not explain, however, why pushing back the estimated date on which the DOE will begin accepting spent nuclear fuel from the industry by four years would not also necessitate pushing back the estimated date for removal of all spent nuclear from the SONGS ISFSI by four years and concomitantly increasing the estimated cost of storing that fuel for an extra four years. Nor does Licensees' 2017 DCE provide any objective evidence supporting its updated assumption that the DOE will, in fact, begin accepting spent nuclear fuel from the industry in 2028.

43. In subsequent decommissioning funding status reports submitted to the NRC, Licensees repeated this updated assumption regarding the date on which the DOE will begin accepting spent nuclear fuel from the industry. *See* **Exhibits 20 and 21**. Specifically, Licensees' status reports expressly acknowledge that the "current site-specific decommissioning cost estimates for San Onofre Unit 1 and San Onofre Units 2 and 3 assume that the DOE will commence transporting fuel in 2028." As in the 2017 DCE, however, Licensees' status reports do not provide any basis for the 2028 assumption, nor do they explain how pushing back the estimated date on which the DOE will begin accepting spent nuclear fuel from the industry would not also necessitate pushing back the date for removal of all spent nuclear fuel from SONGS and concomitantly increasing the

estimated cost of storing that fuel for an extra four years. Notably, however, Licensees' status reports do effectively acknowledge that their fundamental assumptions regarding the DOE's acceptance of spent nuclear fuel are uncertain at best. Indeed, the status reports expressly state that the 2028 assumption "may be updated periodically due to the ongoing uncertainties regarding the availability of a permanent repository for spent fuel."

VIII. DESPITE SERIOUS PUBLIC CONCERNS AND HAZARDOUS CONDITIONS THE NRC PERMITS LICENSEES TO RESUME DANGEROUS BURIAL OF SPENT NUCLEAR FUEL

44. In March 2019, an NRC inspector, Lee Brookhart, issued an internal report concluding that the damaged and defective Holtec canisters would require a formal design change, approved by the NRC, if they were to continue in service under the applicable CoCs, which require loading into the ISFSI to be accomplished without any scratching or damage to the canisters. *See* **Exhibits 27 and 29**. On May 21, 2019, however, the NRC disregarded Mr. Brookhart's warnings, Licensees' string of poor project oversight, Holtec's history of incompetence and malfeasance, and the fanciful assumptions underlying Licensees' entire decommissioning plan, and announced its determination that burial of spent nuclear fuel could continue at SONGS. *See* **Exhibit 22**. Thereafter, in July 2019, Licensees resumed their decommissioning operations, including the burial of spent nuclear fuel at the SONGS ISFSI.

45. Given the uncertainty surrounding the renewed canister burial, as well as litigation seeking to halt the process pending development of a record, Counsel for Petitioner—on September 6, 2019—requested that Licensees briefly abate further interment. *See* **Exhibit 23**. Licensees declined the request and are apparently poised to "continue the transfer operations" and complete the burial of spent nuclear fuel at SONGS as fast as possible. *See* **Exhibit 24**; *see also* **Exhibit 15**.

GROUNDS FOR ORDER IMMEDIATELY SUSPENDING DECOMMISSIONING OPERATIONS

I. APPLICABLE STANDARDS

46. Under 10 C.F.R. § 2.206, "Any person may file a request to institute a proceeding pursuant to § 2.202 to modify, suspend, or revoke a license, or for any other action as may be proper." Upon the filing of a petition under § 2.206, the NRC "may institute a proceeding to modify, suspend, or revoke a license or take such other action as may be proper by serving on the licensee or other person subject to the jurisdiction of the Commission an order that will," among other things, "[a]llege the violations with which the licensee or other person subject to the Commission's jurisdiction is charged, or the potentially hazardous conditions or other facts deemed to be sufficient ground for the proposed action, and specify the action proposed." Petitioner respectfully requests that the NRC issue an order immediately suspending all decommissioning operations at SONGS, including the burial of spent nuclear fuel at the SONGS ISFSI, and requiring Licensees to submit an amended decommissioning plan that properly accounts for the reality that the spent nuclear fuel being buried at SONGS will remain there indefinitely.

II. LICENSEES' BURIAL OF SPENT NUCLEAR FUEL AT SONGS POSES AN IMMINENT THREAT TO PUBLIC SAFETY

47. As detailed above, Licensees are burying hundreds of tons of deadly spent nuclear fuel in thin-wall canisters that cannot be loaded into the storage system without being critically damaged, and cannot be monitored, inspected, repaired, or safely removed once they are loaded. Moreover, at least some of the canisters were surreptitiously redesigned in a way that makes them even more susceptible to failure, and there is no way for anyone to determine whether or when those canisters might fail and cause a nuclear disaster. To make matters worse, Licensees have a proven track record of negligence, if not recklessness, in their past attempts to load the canisters into the SONGS ISFSI, nearly dropping a 49-ton canister full of spent nuclear fuel on at least two occasions.

48. As if this weren't enough, Licensees have elected to bury these defective canisters in perhaps the most hazardous location possible—merely 108 feet from, and only

inches above, a rising Pacific Ocean, in a tsunami zone surrounded by active fault lines, and in a humid environment that is likely to corrode and cause stress-induced cracking of the canisters' outer walls.

49. In other words, the SONGS ISFSI is a proverbial "ticking time bomb," and it is not a matter of whether a nuclear disaster will occur at the site, but a matter of when and how damaging the nuclear disaster will be. Accordingly, the NRC should immediately suspend all decommissioning operations at the SONGS site, including, and especially, the continued burial of spent nuclear fuel, and require Licensees to submit a proposed decommissioning plan that will not pose an imminent threat to public safety.

III. LICENSEES' ESTIMATED COST OF DECOMMISSIONING SONGS IS BASED ON UNREASONABLE AND FUNDAMENTALLY FLAWED ASSUMPTIONS

50. The fundamental premise for Licensees' various decommissioning cost estimates is that the spent nuclear fuel being buried at SONGS will remain there only temporarily. Indeed, Licensees initial DCE was based on the assumption that the DOE will begin accepting spent nuclear fuel from the industry in 2024 and that all spent nuclear fuel will be permanently removed from SONGS by 2049. Accordingly, Licensees' have allocated only enough funds to store and monitor spent nuclear fuel at SONGS through 2049.

51. Both Licensees and the NRC know full well that these assumptions are unreasonable and untethered to reality because there is currently no viable plan for the DOE to construct a permanent repository for spent nuclear fuel and there is certainly no plan or intention for the DOE to begin accepting spent nuclear fuel from the industry in 2024. In fact, the NRC states in its own publications that, although it "considers that 25 to 35 years is a reasonable timeframe for repository development, it acknowledges that there is sufficient uncertainty in this estimate that the possibility that more time will be needed cannot be ruled out." *See* **Exhibit 28**.

52. Although Licensees' 2017 DCE and decommissioning funds status reports push back to 2028 the assumed date on which the DOE will begin accepting spent nuclear

fuel from the industry, this is no more realistic or supported by any actual evidence than the initial 2024 estimate. Furthermore, this updated assumption renders Licensees' cost estimates even more fanciful, because, while they push back the date on which they assume the DOE will begin accepting spent nuclear fuel from the industry, they inexplicably maintain the assumption that all spent nuclear fuel will be permanently removed from SONGS by 2049.

53. By unreasonably assuming that all spent nuclear fuel will be permanently removed from SONGS by 2049, and only allocating sufficient funds to store and monitor the spent nuclear fuel at the site through that date, Licensees grossly understate the full cost of decommissioning SONGS and storing and monitoring spent nuclear fuel at the site through the termination of the SONGS licenses. Among other things, Licensees' cost estimates fail to account for the costs associated with: (1) storing and monitoring fuel beyond 2049 and perhaps permanently; (2) replacing and/or repairing canisters that have degraded, been damaged, and/or outlived their 40-year certifications; and (3) transferring canisters to another location when the storage system itself inevitably degrades and becomes unfit for storage of spent nuclear fuel. Accordingly, the NRC should suspend all decommissioning operations currently underway at SONGS and require Licensees to submit a new decommissioning cost estimate that is grounded in the reality that spent nuclear fuel will be stored at SONGS indefinitely.

IV. LICENSEES' FLAWED DECOMMISSIONING PLAN POSES A LONG TERM THREAT TO PUBLIC SAFETY

54. By falsely assuming that spent nuclear fuel will be stored at SONGS only temporarily, Licensees have not only understated the total cost associated with their decommissioning operations but they have set a disaster off on the horizon that will be unavoidable if not addressed immediately. As already discussed at length, Licensees' entire decommissioning plan, including all decisions related to the location of the SONGS ISFSI, the selection of the Holtec storage system and canisters, and the estimated cost of

decommissioning and monitoring spent fuel at SONGS, are predicated on the false assumption that spent nuclear fuel will be stored at SONGS only temporarily.

55. Licensees selected a storage system with an extremely limited warranty and usable life based on the false assumption that it will be empty and demolished in thirty years. Licensees selected defective canisters with limited warranties that cannot be safely replaced when damaged based on the false assumption that the DOE would be removing them in thirty years. And Licensees selected a hazardous storage location near a rising sea based on the false assumption that the spent nuclear fuel will be permanently removed by the time the storage facility is underwater. If the NRC does not suspend decommissioning operations now, these fanciful assumptions will inevitably lead to a disastrous reality for the millions of people who reside in the vicinity of SONGS. Accordingly, the NRC should immediately suspend all decommissioning operations at SONGS, including and especially the burial of spent nuclear fuel in the SONGS ISFSI, and require Licensees to submit a new decommissioning plan that is grounded in the reality that the spent nuclear fuel being buried at SONGS will remain there indefinitely, if not permanently.

V. THE NRC'S FAILURE TO PREPARE AN ENVIRONMENTAL ASSESSMENT OR SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PRIOR TO APPROVING DECOMMISSIONING ACTIVITIES VIOLATES NEPA AND THE APA

56. The NRC failed to prepare either an environmental assessment ("EA") or an environmental impact statement ("EIS") prior to issuing the July 17, 2015 license amendment or otherwise approving decommissioning activities at SONGS Units 2 and 3, in violation of the National Environmental Policy Act ("NEPA"), the Administrative Procedure Act ("APA"), and the NRC's own regulations.

57. NEPA requires all federal agencies to conduct environmental evaluations of any "major federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). "Major federal actions" are defined broadly to include "new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies." 40 C.F.R.

§ 1508.18. When an agency is uncertain whether a proposed action will significantly affect the environment, it must prepare an EA to determine whether the preparation of a more detailed EIS is necessary. 40 C.F.R §§ 1508.9(a), 1508.13 (2009); *see also California Wilderness Coal. v. U.S. Dep't of Energy*, 631 F.3d 1072, 1097 (9th Cir. 2011) ("If the proposed action does not categorically require the preparation of an EIS, the agency must prepare an EA to determine whether the action will have a significant effect on the environment."). In either case, NEPA obligates federal agencies to take a "hard look" at the potential environmental consequences of proposed actions. *California Wilderness Coal.*, 631 F.3d at 1097 (9th Cir. 2011).

58. The NRC's issuance of a license amendment and approval of decommissioning activities at SONGS Units 2 and 3 constituted a "major federal action" that required NEPA compliance. As an initial matter, the NRC has historically prepared either an EA or EIS upon issuing a license amendment at SONGS Units 2 and 3. In 1981, the NRC prepared an EIS when it issued the initial operating license to Edison for Units 2 and 3. *See* **Exhibit 30**. The NRC then prepared EAs each time it amended the license. For example, in 1996, it prepared an EA prior to approving a license amendment to allow an increase in fuel enrichment. *See* **Exhibit 31**. In 2001, it prepared an EA prior to approving a license amendment to allow Edison to increase its maximum reactor core power level. *See* **Exhibit 32**. And in 2015, it prepared an EA prior to approving an amendment allowing security personnel to use certain firearms and ammunition on site. *See* **Exhibit 33**. The NRC's failure to prepare either an EA or EIS prior to issuing a license amendment and approving decommissioning activities is contrary to its prior practice at SONGS.

59. Furthermore, the NRC's own regulations and guidance documents state that the NRC will prepare an EA or EIS prior to authorizing decommissioning. The NRC's regulations provide that "[i]n connection with the amendment of an operating or combined license authorizing decommissioning activities . . . the NRC staff will prepare a supplemental environmental impact statement for the post operating or post combined

license stage or an environmental assessment." 10 C.F.R. part 51.95(d). Similarly, the NRC's Environmental Review Guidance for Licensing Actions Associated with NMSS Programs NUREG-1748 (2003) states that the NEPA review process is "usually initiated by . . . a decommissioning plan submitted to the NRC." *See* **Exhibit 34** at 1-2.

60. Numerous federal courts have also noted that "decommissioning is an action which, even under the [NRC's] new policy, requires NEPA compliance." *See, e.g.*, *Citizens Awareness Network, Inc. v. U.S. Nuclear Regulatory Comm'n*, 59 F.3d 284, 293 (1st Cir. 1995); *see also New Jersey v. U.S. Nuclear Regulatory Comm'n*, 526 F.3d 98, 103 (3d Cir. 2008) ("[T]he NRC will conduct site-specific environmental analyses when licensees decommission…"); *see also Benton Cty. v. U.S. Dep't of Energy*, 256 F. Supp. 2d 1195, 1202 (E.D. Wash. 2003) ("Prior to committing any resources to any one of the options for decommissioning, the [agency] must prepare an EIS."). Thus, the NRC was required to prepare either an EA or EIS prior to approving the Decommissioning Plan.

61. The NRC partially discharged its duty to comply with NEPA prior to decommissioning through the Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, NUREG-0586 (1988), as supplemented by NUREG-0586, Supplement 1 (2002) (collectively, the "Decommissioning GEIS"). *See* **Exhibit 35**. The generic EIS analyzed the environmental impacts of decommissioning that are common to all sites. But the Decommissioning GEIS concluded that a site-specific supplemental EIS would be necessary to evaluate non-generic issues, such as the environmental impacts of decommissioning on environmental justice and threatened and endangered species:

> The staff has considered available information on the potential impacts of decommissioning on environmental justice, including comments received on the draft of Supplement 1 of NUREG-0586. Based on this information, the staff has considered that the adverse impacts and associated significance of the impacts must be determined on a site-specific basis . . . . Subsequent to the submittal of the PSDAR, the NRC staff will consider the impacts related to environmental justice from decommissioning activities.

See **Exhibit 35** Supp. 1 at 4-65.

> The staff has considered available information on the potential impacts of decommissioning on threatened and endangered species, including comments received on the draft of Supplement 1 of NUREG-0586. Based on this information, the staff has considered that the adverse impacts and associated significance of the impacts must be determined on a site-specific basis.

See **Exhibit 35** Supp. 1 at 4-30. The NRC's regulations and guidance documents purport to fill these gaps in the Decommissioning GEIS by requiring the NRC to prepare either an EA or supplemental EIS prior to approving a decommissioning plan. *See, e.g.*, 10 C.F.R. 51.95(d). The NRC, however, failed to prepare either an EA or supplemental EIS when it approved Edison's license amendment and authorized decommissioning at SONGS Units 2 and 3.

62. The City of Laguna Beach ("City") notified the NRC of this failure to comply with NEPA at SONGS in its August 12, 2016 letter. *See* **Exhibit 36**. Notably, the California State Lands Commission ("CSLC") correctly determined that the decommissioning activities required the CSLC to prepare an Environmental Impact Report ("EIR") under California's Environmental Quality Act ("CEQA"), which is the State of California's NEPA analog. In connection with preliminary scoping of the CSLC EIR, the City insisted that the NRC prepare a supplemental EIS, as required by NEPA, or alternatively prepare a joint EIS with the CSLC, as authorized by NEPA's implementing regulations. *See* 40 C.F.R. 1506.2. The City expressed specific concern over the following issues:

- The NRC has not considered the environmental and safety effects of sea level rise caused by climate change.

- The NRC has not addressed the environmental impacts of decommissioning on environmental justice, threatened and endangered species, offsite land use, offsite aquatic and terrestrial ecology, and certain cultural and historic resources.

- The NRC has not approved the design of the Holtec UMAX system that Edison has proposed for the ISFSI and that a partially subterranean design may reduce radiation safety.

- The NRC has not addressed certain radiological safety concerns, such as the site-specific radiological safety concern of storing SNF in a seismically active marine environment, which is not addressed in the Decommissioning GEIS.

- The proposed changes and alterations to the SONGS facility's design associated with decommissioning, including the Spent Fuel Pool Island Project and the expanded and modified ISFSI, were never addressed in the SONGS Final Safety Analysis Report ("FSAR") and thus require a separate license amendment.

63. Despite the City's letter, the NRC failed to take corrective action. Instead, the NRC took the incorrect and inconsistent position that it was not required to prepare an EA or supplemental EIS in connection with approving decommissioning, because the "decommissioning activities remain within the scope of the Decommissioning GEIS [and] applicable site-specific NEPA analyses conducted in support of previous licensing actions." *See* **Exhibit 37**. Specifically, the NRC claimed that review of "site-specific environmental impacts (*i.e.*, those not dispositioned generically in the Decommissioning GEIS) are first addressed in the [1981 EIS]" and were additionally "analyzed in the EA/FONSIs for license amendment or exemption requests during the plant's operation," such as the 1996 EA, 2001 EA, and 2015 EA. But this is plainly untrue. The prior site-specific analyses at SONGS never addressed the potential environmental impacts of decommissioning. They addressed the potential environmental impacts of the proposed actions stated therein (*e.g.*, a license amendment to allow security personnel to carry certain ammunition on-site). *See* **Exhibit 33**. These prior analyses do not act to satisfy the NRC's duty to prepare a site-specific supplemental EIS for non-generic decommissioning issues, as contemplated by the Decommissioning GEIS and NRC.

64. This is not the first time the NRC has failed to comply with its own regulations in the context of preparing site-specific supplemental EISs that tier off of a

generic EIS. In August 2013, the Office of the Inspector General ("OIG") audited the NRC's NEPA compliance and concluded that the NRC had an "incorrect understanding of the regulations related to scoping for EISs that tier off of a generic EIS." *See* **Exhibit 38** at 24. The issue here is similar. The NRC's reasoning for refusing to prepare a supplemental site-specific EIS is based on an incorrect understanding of its own regulations and the role of the Decommissioning GEIS.

65. The NRC's failure to prepare either an EA or supplemental EIS prior to approving Edison's license amendment and authorizing decommissioning at SONGS Units 2 and 3 is contrary to the Decommissioning GEIS, NRC regulations, and federal court opinions. In addition, it violates NEPA, 42 U.S.C. § 4332(2)(C), and constitutes arbitrary and capricious conduct under the Administrative Procedure Act, 5 U.S.C. § 706. Petitioner therefore requests that the NRC immediately suspend all decommissioning operations at SONGS and prepare a supplemental EIS that evaluates site-specific environmental issues not addressed in the Decommissioning GEIS or prior site-specific NEPA analyses, such as the those issues referenced herein. In so doing, the NRC should (1) discuss mitigation measures the agency could take to reduce environmental impacts; (2) discuss the direct, indirect, and cumulative impacts that may result from decommissioning activities; and (3) ensure the use of "accurate scientific analysis" and "high quality" information. 40 C.F.R. §§ 1500.1(b), 1508.25(b).

Dated: September 24, 2019

BARNES & THORNBURG LLP

By: /s/ Charles G. La Bella
Charles G. La Bella
Attorneys for Plaintiff
Public Watchdogs

TAB 4

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Thomas J. Palmisano
Vice President & Chief Nuclear Officer

10 CFR 50.82(a)(4)(i)

September 23, 2014

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington D.C. 20555-0001

Subject: **Docket Nos. 50-361 and 50-362,**
San Onofre Nuclear Generating Station, Units 2 and 3
Post-Shutdown Decommissioning Activities Report

Reference Letter from P.T. Dietrich (SCE) to the U.S. Nuclear Regulatory Commission dated June 12, 2013; Subject: Certification of Permanent Cessation of Power Operations, San Onofre Nuclear Generating Station, Units 2 and 3

Dear Sir or Madam:

On June 12, 2013, in accordance with 10 CFR 50.82(a)(1)(i), Southern California Edison (SCE) submitted the referenced letter to the U.S. Nuclear Regulatory Commission (NRC) certifying the permanent cessation of operations at San Onofre Nuclear Generating Station (SONGS), Units 2 and 3. In accordance with 10 CFR 50.54(bb) and 10 CFR 50.82(a)(4)(i), SCE is required to submit an Irradiated Fuel Management Plan (IFMP), Site Specific Decommissioning Cost Estimate (DCE) and Post-Shutdown Decommissioning Activities Report (PSDAR) within two years of permanent cessation of operations.

The SONGS, Units 2 and 3 PSDAR is attached. The SONGS, Units 2 and 3 IFMP and DCE are being concurrently submitted under separate cover letters. The descriptions of decommissioning activities and phases in the PSDAR are consistent with those described in the DCE. Both the PSDAR and DCE represent SCE's current plans and are subject to change as the project progresses.

Changes to significant details will be included in subsequent revisions to the PSDAR as required by 10 CFR 50.54(bb). Financial assurance information will be provided on an annual basis as required by 10 CFR 50.75(f)(1).

This letter does not contain any new commitments.

If there are any questions or if additional information is needed, please contact me or Ms. Andrea Sterdis at (949) 368-9985.

Sincerely,

P.O. Box 128
San Clemente, CA 92672
(949) 368-6575 PAX 86575
Fax: (949) 368-6183
Tom.Palmisano@sce.com

A091
NRR

Enclosure: San Onofre Nuclear Generating Station Units 2 and 3 Post-Shutdown Decommissioning Activities Report

cc: M. L. Dapas, Regional Administrator, NRC Region IV
T. J. Wengert, NRC Project Manager, San Onofre Units 2 and 3 Decommissioning
R. E. Lantz, NRC Region IV, San Onofre Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 and 3
S. Y. Hsu, California Department of Health Services, Radiologic Health Branch

San Onofre Nuclear Generating Station Units 2 and 3
Post-Shutdown Decommissioning Activities Report

TABLE OF CONTENTS

List of Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
AIF	Atomic Industrial Forum
ALARA	As Low As Reasonably Achievable
BMP	Best Management Practices
CCC	California Coastal Commission
CFR	Code of Federal Regulations
CRWQCB	California Regional Water Quality Control Board
CSLC	California State Lands Commission
DBA	Design Basis Accident
DCE	Decommissioning Cost Estimate
Decon Pd	License Termination Period
DGC	Decommissioning General Contractor
DOE	United States Department of Energy
DOT	United States Department of Transportation
DSC	Dry Storage Canister
FES	Final Environmental Statement, SONGS Units 2 and 3 (NUREG-0490)
GEIS	Generic Environmental Impact Statement (NUREG-0586)
GTCC	Greater than Class C
HSM	Horizontal Storage Modules
IFMP	Irradiated Fuel Management Plan
ISFSI	Independent Spent Fuel Storage Installation
LTP	License Termination Plan
LLRW	Low Level Radioactive waste
MARRSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MWDOC	Municipal Water District of Orange County
MWt	Megawatt-thermal
NEI	Nuclear Energy Institute
NPDES	National Pollutant Discharge Elimination System
NRC	United States Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
PSDAR	Post-Shutdown Decommissioning Activities Report
PWR	Pressurized Water Reactor
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
RV	Reactor Vessel
SONGS	San Onofre Nuclear Generating Station
SCE	Southern California Edison
SDAPCD	San Diego Air Pollution Control District
SFP	Spent Fuel Pool
SNF Pd	Spent Fuel Period
SFSM	Spent Fuel Storage Modules
SPCC	Spill Prevention Control and Countermeasures
SR Pd	Site Restoration Period
SSC	Structures, Systems, and Components
UFSAR	Updated Final Safety analysis Report
USCB	United States Census Bureau

I. INTRODUCTION AND SUMMARY

A. Introduction

1. Historical Perspectives

San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 have been owned by four entities. Two are municipalities (Riverside and Anaheim) and two are investor owned utilities: San Diego Gas & Electric (SDG&E) and Southern California Edison (SCE, the Owner-Operator and agent for the participants). The relative obligation for operation and decommissioning varies by unit and entity. The term "SONGS Participants" is used in this report to represent the four entities that have continuing decommissioning obligations.

SONGS Unit 1 was shut down in 1992 with on-shore facilities largely dismantled by 2009 and off-shore conduits being fully dispositioned this year (2014). The decision has been made to shut down and decommission Units 2 and 3. Since the decision to shut down SONGS Units 2 and 3, the focus of SONGS staff and other personnel has been to plan and begin execution of the necessary steps to achieve timely, cost-effective, and safe decommissioning and restoration of the SONGS site.

In developing its plans, SONGS has benchmarked the experiences of commercial decommissioning projects in the 1990s and 2000s and has sought the input from experienced individuals and groups with a wide range of such experience. SONGS maintains close communications with those facilities currently undergoing decommissioning and with many of the organizations supporting those efforts. In particular, both the Zion and Humboldt Bay plants are currently undergoing active decommissioning. Three others (Kewaunee, Crystal River 3, and Vermont Yankee) are, or soon will be, entering SAFSTOR conditions of varying durations prior to dismantlement.

Earlier decommissioning projects faced a number of first-time technical challenges, such as cutting reactor vessel (RV) internals in a high radiation environment. SONGS' reviews indicate that many of the technical challenges confronting SONGS decommissioning now have mature solutions. Similarly, our predecessors provide a wealth of knowledge to minimize worker radiation exposure, efficiently plan, and sequence a decommissioning project and safely manage and transport waste.

The SONGS Participants have the responsibility to restore the site in accordance with applicable regulations and agreements. The SONGS Participants have a responsibility to their stakeholders and the communities they serve to do so in a transparent and effective manner while striving to attain high standards of safety and environmental protection. Further, the SONGS Participants will have a limited, if any, role in the future use of the site. The ultimate use for the site is for the land-owner (U.S. Navy) to determine with input from the community at large.

2. Community Engagement

A key lesson-learned in our review of other decommissioning projects is the continued importance of community engagement during the decommissioning process. The SONGS Participants are committed

to engaging the local community and its leaders in an open, transparent, and proactive manner. SONGS is actively engaged with external stakeholders to: understand their priorities; inform them of SONGS plans; and, to seek their input on the safe, timely, and cost-effective decommissioning of SONGS.

The SONGS Participants are actively engaging with the community through public outreach including briefings for community groups and routine educational updates for local, state, and federal officials. The SONGS participants have formed the Community Engagement Panel (CEP) with members representing a broad range of stakeholders to advise SONGS on decommissioning matters. The panel meets at least quarterly to facilitate dialogue and includes several representatives of government, members from academia, labor, business, environmental organization, and a local anti-nuclear leader. Members of the CEP were provided with the opportunity to review and provide input on this document as well as the Decommissioning Cost Estimate (DCE) and the Irradiated Fuel Management Plan (IFMP). As a precursor to review of these submittals, SONGS hosted two workshops with external technical experts to provide the CEP members with a depth of knowledge in these areas. Feedback from the panel was addressed prior to finalization and SCE senior management authorization of the submittals.

SONGS also has established a website, www.SONGScommunity.com, as a dedicated online source for information on the plant and the decommissioning process. The website includes background information on decommissioning, links to other websites including the NRC, and an "opt-in" feature that allows members of the community to register for automatic updates on decommissioning matters.

3. Regulatory Basis

In accordance with the requirements of 10 CFR 50.82, "Termination of License," paragraph (a)(4)(i), this report constitutes the Post-Shutdown Decommissioning Activities Report (PSDAR) for SONGS Units 2 and 3. The PSDAR contains the following:

1. A description of the planned decommissioning activities along with a schedule for their accomplishment.
2. A site-specific DCE including the projected cost of managing irradiated fuel and site restoration (being submitted concurrently).
3. A discussion that provides the basis for concluding that the environmental impacts associated with the site-specific decommissioning activities will be bounded by the appropriate previously issued generic and plant specific environmental impact statements.

The PSDAR has been developed consistent with NRC Regulatory Guide 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report." This report is based on currently available information; however, the plans discussed may be modified as additional information becomes available or as circumstances change. As required by 10 CFR 50.82(a)(7), SCE will notify the Nuclear Regulatory Commission (NRC) in writing before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules described in the PSDAR, including changes that significantly increase the decommissioning cost.

The IFMP and DCE are being submitted concurrently with the PSDAR. The technical, schedule, and cost information provided is consistent among these submittals.

B. Background

The SONGS site is located on the coast of southern California in San Diego County, approximately 62 miles southeast of Los Angeles and 51 miles northwest of San Diego. The site is located entirely within the boundaries of the United States Marine Corps Base Camp Pendleton. The site is approximately 4,500 feet long and 800 feet wide, comprising 84 acres. The site does not include office buildings and related facilities located east of Interstate 5 (I-5) referred to as "the Mesa" or other adjacent parcels.

The property on which the station is built is subject to an easement from the United States Government through the U. S. Navy. The nearest privately owned land is approximately 2.5 miles from the site.

SONGS Units 2 and 3 is a two-unit site with supporting facilities. The reactors were previously licensed to produce 3,438 MWt each. An on-site Independent Spent Fuel Storage Installation (ISFSI) used to store SONGS Units 1, 2 and 3 fuel, located on the portion of the site previously occupied by SONGS Unit 1. Storage at the ISFSI was initiated in 2003 and the pad was subsequently (2007) expanded to support the currently placed 63 Horizontal Storage Modules in which 51 Dry Storage Containers (DSCs) have been installed to-date: 50 containing irradiated fuel and one (1) containing Greater-Than-Class-C (GTCC) materials. The most recent loading campaign was conducted in 2012. As discussed in the Spent Fuel Management Period details and the concurrently submitted IFMP, it will be necessary to further expand the current ISFSI capacity to store the complete inventory of Units 2 and 3 spent fuel. The location, capacity, and technology to be employed have not yet been finalized.

A brief history of the major milestones related to plant construction and operation is as follows:

	UNIT 2	UNIT 3
• Construction Permit Issued	October 18, 1973	October 18, 1973
• Operating License Issued	February 16, 1982	November 15, 1982
• Full Power Operation	June 15, 1983	November 18, 1983
• Final Reactor Operation	January 9, 2012	January 31, 2012

On June 7, 2013, SCE announced its decision to permanently cease power operations and decommission SONGS Units 2 and 3. By letter dated June 12, 2013 (Reference 3), SCE notified the NRC of its decision to permanently cease power operations. SCE has submitted two letters dated July 22, 2013 (Reference 5) and June 28, 2013 (Reference 4) certifying that fuel has been removed from the Unit 2 and 3 reactors, respectively.

Pursuant to 10 CFR 50.51(b), "Continuation of License," the license for a facility that has permanently ceased operations, continues in effect beyond the expiration date to authorize ownership and possession of the facility until the NRC notifies the licensee in writing that the license has been

terminated. During the period that the license remains in effect, 10 CFR 50.51 (b) requires the licensee to:

(1) Take actions necessary to decommission and decontaminate the facility and continue to maintain the facility, including, where applicable, the storage, control and maintenance of the spent fuel, in a safe condition, and

(2) Conduct activities in accordance with all other restrictions applicable to the facility in accordance with the NRC regulations and the provisions of the specific 10 CFR part 50 licenses for the facility.

C. Summary of Decommissioning Alternatives

The NRC has evaluated the environmental impacts of three general methods for decommissioning power reactor facilities in NUREG-0586, "Final Generic Environmental Impact Statement (GEIS) on Decommissioning Nuclear Facilities," Supplement 1 (Reference 6). The three general methods are:

- **DECON:** The equipment, structures, and portions of the facility and site that contain radioactive contaminants are promptly removed or decontaminated to a level that permits termination of the license after cessation of operations.
- **SAFSTOR:** The facility is placed in a safe stable condition and maintained in that state (safe storage) until it is subsequently decontaminated and dismantled to levels that permit license termination. During SAFSTOR, a facility is left intact or may be partially dismantled, but the fuel has been removed from the reactor vessel and radioactive liquids have been drained from systems and components and then processed. Radioactive decay occurs during the SAFSTOR period, thus reducing the levels of radioactivity in and on the material and potentially the quantity of radioactive material that must be disposed of during the decontamination and dismantlement.
- **ENTOMB:** Radioactive structures, systems, and components are encased in a structurally long-lived substance such as concrete. The entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level that permits termination of the license.

The SONGS Participants have chosen the DECON method. SONGS is currently in the planning period during which the site is preparing for safe and orderly transition to dismantlement. More specifically:

- Permanent cessation of operations was announced on June 7, 2013.
- DECON methodology was selected (prompt decontamination and dismantlement after initial planning period).
- Additional ISFSI capacity will be added to meet all of the site's needs.
- Initial site characterization activities are underway.
- Plans to isolate the Spent Fuel Pools (referred to as "islanding") are in development.
- Other necessary actions to facilitate safe system retirement and removal (referred to as "cold and dark") are in development.

When the required regulatory reviews, planning, and preparation are sufficiently complete, the site will move into active decontamination and dismantlement. Current plans are for that period to overlap with completion of the relocation of spent fuel from the Spent Fuel Pools to the ISFSI.

The SONGS facility will be decontaminated and dismantled (D&D) to levels that permit termination of the NRC licenses and in accordance with the requirements agreed to by the United States Navy in the easement for the site. In support of this and in accordance with 10 CFR 50.82(a)(9), a License Termination Plan will be developed and submitted for NRC approval at least two years prior to termination of the license.

The decommissioning approach for SONGS is described in more detail in the following sections:

- Section II summarizes the planned decommissioning activities and general timing of their implementation.
- Section III summarizes the cost estimating methodology employed by Energy*Solutions* and references the site specific DCE being submitted concurrently.
- Section IV describes the basis for concluding that the environmental impacts associated with decommissioning SONGS Units 2 and 3 are bounded by the most recent site-specific environmental impact statement and NRC GEIS related to decommissioning.

II. DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

The SONGS Units 2 and 3 decommissioning project is currently in the planning period transitioning to DECON as soon as necessary planning, approvals, and conditions permit doing so in a safe and cost-effective manner. DECON is defined in Section I.C of this report.

Table II-1 provides a summary of the current decommissioning plan and schedule for SONGS Units 2 and 3. The major decommissioning periods and general sequencing of the activities that will occur during each period identified in Table II-1 are discussed in more detail in the sections that follow. The periods are logical groupings of activities. The categories are also consistent with the Nuclear Decommissioning Trust (NDT) funds which are allocated based on specific regulatory requirements. The activities executed during these periods will, in many cases progress in parallel, and may not be as completely segregated as the description implies. For instance, while distinct decontamination and dismantlement activities are listed, it may be determined to be more effective from dose, labor, or waste disposal perspectives to dismantle structures and systems and dispose of them as radioactive waste rather than decontaminate them and dispose of the balance as non-radioactive waste.

The planning required for each decommissioning activity, including the selection of the process to perform the work, will be performed in accordance with appropriate governance and oversight processes. Based on current plans, no decommissioning activities unique to the site have been identified and no activities or environmental impacts outside the bounds considered in the GEIS have been identified. Appropriate radiological and environmental programs will be maintained throughout

the decommissioning process to ensure radiological safety of the workforce and the public and environmental compliance is maintained.

Table II-1
San Onofre Nuclear Generating Station Units 2 and 3
Current Schedule of Decommissioning Periods

Task Name	Start	Finish
Part 50 License Termination (other than ISFSI)		
Announcement of Cessation of Operations	06/07/2013	N/A
Decon Period 1 – Transition to Decommissioning	06/07/2013	12/31/2013
Decon Period 2 – Decommissioning Planning and Site Modifications	01/01/2014	06/30/2015
Decon Period 3 – Decommissioning Preps/Reactor Internals Segmentation	06/30/2015	06/01/2019
Decon Period 4 – Plant Systems and Large Component Removal	06/01/2019	09/24/2022
Decon Period 5 – Building Decontamination	09/24/2022	07/13/2024
Decon Period 6 – License Termination During Demolition	07/13/2024	12/24/2032
Spent Fuel Management		
SNF Period 1 – Spent Fuel Management Transition	06/07/2013	12/31/2013
SNF Period 2 - Spent Fuel Transfer to Dry Storage	01/01/2014	06/01/2019
SNF Period 3 – Dry Storage During Decommissioning – Units 1, 2 & 3	06/01/2019	12/05/2031
SNF Period 4 – Dry Storage Only – Units 1, 2 & 3	12/05/2031	12/31/2035
SNF Period 5 – Dry Storage Only – Units 2 & 3	12/31/2035	12/31/2049
SNF D&D Period 1 – ISFSI Part 50 License Termination	12/31/2049	05/06/2050
SNF D&D Period 2 – ISFSI Demolition	05/06/2050	09/08/2051
Site Restoration		
SR Period 1 – Transition to Site Restoration	06/07/2013	06/30/2015
SR Period 2 – Building Demolition During Decommissioning	06/30/2015	07/11/2017
SR Period 3 – Subsurface Demolition Engineering and Permitting	10/01/2019	07/13/2024
SR Period 4 – Building Demolition to 3 Feet Below Grade	07/13/2024	10/14/2028
SR Period 5 – Subgrade Structure Removal Below -3 Feet	10/14/2028	12/5/2031
SR Period 6 – Final Site Restoration and Easement Termination	05/06/2050	12/15/2051
Final Easement Termination	12/15/2051	N/A

Note [1]: Shipping dates are assumed based on the previously documented positions of the DOE, which indicates that shipments from the industry could begin as early as 2024 and SONGS place in the current queue. Both are subject to changes.

A. Detailed Breakdown of License Termination Periods

The License Termination Periods (referred to as decontamination periods) include those activities necessary to remove or reduce the levels of radioactive contamination to levels necessary to terminate the Part 50 licenses for the site (other than the ISFSI) and release it back to the Navy. Also included are the development, submittal, and support for the review of the primary decommissioning documents.

TAB 5

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Thomas J. Palmisano
Vice President & Chief Nuclear Officer

10 CFR 50.82(a)(4)(i)

September 23, 2014

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington D.C. 20555-0001

Subject: **Docket Nos. 50-361 and 50-362,**
San Onofre Nuclear Generating Station, Units 2 and 3
Irradiated Fuel Management Plan

Reference Letter from P.T. Dietrich (SCE) to the U.S. Nuclear Regulatory Commission, dated June 12, 2013; Subject: Certification of Permanent Cessation of Power Operations, San Onofre Nuclear Generating Station, Units 2 and 3

Dear Sir or Madam:

On June 12, 2013, SCE submitted the referenced letter to the U.S. Nuclear Regulatory Commission (NRC) certifying the permanent cessation of operations at San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, in accordance with 10 CFR 50.54(bb) and 10 CFR 50.82(a)(4)(i), Southern California Edison (SCE) is required to submit an Irradiated Fuel Management Plan (IFMP), Site Specific Decommissioning Cost Estimate (DCE) and Post-Shutdown Decommissioning Activities Report (PSDAR) within two years of permanent cessation of operations.

The SONGS, Units 2 and 3 IFMP is attached. The DCE and PSDAR are being concurrently submitted under separate cover letters. The IFMP represents SCE's current plans and is subject to change as the project progresses. In particular, the Independent Spent Fuel Storage Installation location, and storage equipment and vendor(s) have not been selected. The decision making and procurement activities are underway but have not been finalized.

Changes to significant details will be included in subsequent revisions to the IFMP as required by 10 CFR 50.54(bb). Financial assurance information will be provided on an annual basis as required by 10 CFR 50.75(f)(1).

This letter does not contain any new commitments.

If there are any questions or if additional information is needed, please contact me or Ms. Andrea Sterdis at (949) 368-9985.

Sincerely,

P.O. Box 128
San Clemente, CA 92672
(949) 368-6575 PAX 86575
Fax: (949) 368-6183
Tom.Palmisano@sce.com

A001
NRR

Enclosure: San Onofre Nuclear Generating Station Units 2 and 3 Irradiated Fuel Management Plan

cc: M. L. Dapas, Regional Administrator, NRC Region IV
T. J. Wengert, NRC Project Manager, SONGS, Units 2 and 3
T. J, Warnick, NRC Project Manager, San Onofre Units 2 and 3 Decommissioning
R. E. Lantz, NRC Region IV, San Onofre Units 2 and 3
S. Y. Hsu, California Department of Health Services, Radiologic Health Branch

I. Background and Introduction

On June 12, 2013, Southern California Edison (SCE) submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) (Reference 1) certifying the permanent cessation of operations at San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 effective June 7, 2013, in accordance with 10 CFR 50.82(a)(1)(i). All fuel was removed from the SONGS Units 2 and 3 reactor vessels and placed in their respective spent fuel pools as certified in accordance with 10 CFR 50.82(a)(1)(ii) (References 2 and 3).

Pursuant to 10 CFR 50.54(bb), licensees are required to submit a plan for the management of irradiated fuel until title and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository. The Irradiated Fuel Management Plan (IFMP) is required to be submitted to the Commission either five years before expiration of the Operating License or within two years following permanent cessation of operations, whichever occurs first. Therefore, the SONGS Units 2 and 3 plans are required to be submitted prior to June 7, 2015, two years following the cessation of operations. This submittal constitutes SCE's IFMP for SONGS Units 2 and 3, submitted on behalf of itself and the other SONGS Participants responsible for the funding of the SONGS decommissioning. The other SONGS Participants are the City of Anaheim, the City of Riverside, and San Diego Gas & Electric Company (SDG&E).

Energy*Solutions*, LLC has prepared a site-specific decommissioning cost estimate (DCE) for SONGS Units 2 and 3 (Reference 15). The DCE identifies the details, schedules, and costs of spent fuel management activities associated with the IFMP, along with license termination and site restoration activities and costs. This DCE is being submitted concurrent with the Post-Shutdown Decommissioning Activities Report (PSDAR, Reference 4) and this plan. The assumptions regarding the United States Department of Energy (US DOE) acceptance of irradiated fuel is consistent with the Energy*Solutions* DCE and is based on testimony filed with the California Public Utility Commission (Reference 13). The SONGS Units 2 and 3 DCE and this IFMP are based on commencement of industry-wide acceptance of spent fuel by US DOE in 2024.

II. Irradiated Fuel Management Strategy

The safe initial interim storage of SONGS Units 2 and 3 irradiated fuel will be "wet storage" in each unit's respective spent fuel pool. The spent fuel pools will be isolated from their normal support systems and those systems replaced by stand-alone cooling and filtration units (also termed a "spent fuel pool island"). Doing so facilitates earlier system abandonment and parallel decommissioning activities.

Subsequently, all irradiated fuel in the SONGS Units 2 and 3 spent fuel pools will be safely transferred to "dry storage" at the common Independent Spent Fuel Storage Installation (ISFSI) located on the SONGS site. Dry storage is also considered interim storage pending transfer to the US DOE.

A total of 1,726 irradiated fuel assemblies have been generated in SONGS Unit 2 and 1,734 irradiated fuel assemblies have been generated in SONGS Unit 3, for a total of 3,460 irradiated fuel assemblies. At present, 792 SONGS Units 2 and 3 irradiated fuel assemblies have already been transferred to the common ISFSI. The remaining 2,668 irradiated fuel assembles will be loaded into Dry Shielded Canisters (DSCs) and transferred to the ISFSI.

The current ISFSI is located inside the Owner Controlled Area. It was constructed to accommodate SONGS Unit 1 irradiated fuel and provides additional capacity for a limited amount of SONGS Units 2 and 3 irradiated fuel.

The ISFSI currently contains 18 DSCs storing Unit 1 fuel and Greater than Class C (GTCC) waste. The ISFSI also contains 33 DSCs which store Units 2 and 3 fuel. All of the fuel on the ISFSI is stored in Transnuclear NUHOMS Model Number-24PT1 or PT4 DSCs.

The major IFMP activity phases, including start and end dates and associated costs for each period are identified in Table 1. The identified Spent Nuclear Fuel (SNF) Periods are developed in and align with the site-specific DCE (Reference 15).

The current plans are to obtain necessary permits for the ISFSI to be expanded to accommodate the remaining inventory of the SONGS Units 2 and 3 spent fuel pools. SONGS plans to commence the movement of irradiated fuel from the Unit 2 and Unit 3 pools to the ISFSI in 2017. SONGS expects to complete the transfer in 2019. Additional DSCs will be procured from one or more of the available dry storage system suppliers beginning in 2014. An additional 47 DSCs will be required for the SONGS Unit 2 irradiated fuel and an additional 44 DSCs will be required for the SONGS Unit 3

irradiated fuel (depending on the capacity of the selected system and the number of DSCs needed to store GTCC waste and other materials). The spent fuel pool inventory is forecast to be transferred to the ISFSI no later than the end of 2019.

The US DOE Standard Contracts for acceptance and disposal of spent nuclear fuel and high level waste contain the basis for the initial ranking of industry-wide spent fuel acceptance obligations based upon the date of permanent removal of the spent nuclear fuel from service ("oldest fuel first" allocation). Those Standard Contracts also contain provisions allowing for "exchanges" of acceptance obligations, and priority for retired units. Given the US DOE's lack of performance, a common assumption for purposes of this fuel management plan is to base acceptance projections upon application of an "oldest fuel first" allocation scheme to a projected start date for repository operations. This plan is based upon a 2024 start date (Reference 13) for US DOE acceptance of spent fuel from the industry and the SONGS Units 2 and 3 positions in the queue. As indicated in Table 3, SCE is therefore assuming all fuel will be removed from the SONGS site as of 2049. Based on this assumption, the ISFSI will be subsequently decommissioned by the 2051 final license termination date.

III. Financial Assurance

The regulations (10 CFR 50.54(bb)) also require that funding adequacy be demonstrated to support the irradiated fuel management plan.

The cost of twelve (12) additional DSCs to be stored on the current ISFSI was funded from sources other than the Nuclear Decommissioning Trusts (NDT) (Reference 5), as are the costs associated with ongoing storage of Unit 1 spent fuel at the GE-Hitachi Nuclear America LLC's Morris Operation ISFSI located in Morris, Illinois. Table 1 includes the costs of procurement and construction of the expanded ISFSI capacity and all loading costs. Operation of the spent fuel pools is modeled as being discontinued in 2019 after all of the fuel has been transferred to dry storage. ISFSI operations continue until the US DOE is able to complete the transfer of the SONGS fuel to a repository or interim storage facility, which is currently assumed to occur by 2049.

SONGS management is committed to providing consistent and up-to-date information to all of its stakeholders and regulators. Aspects of the SONGS Nuclear Decommissioning Trust Fund are regulated by both the California Public Utilities Commission (CPUC) and the NRC. Previous Decommissioning Cost Estimates (DCEs) were updated and submitted to the CPUC as part of the Nuclear Decommissioning Cost Triennial Proceedings (Reference 5). Financial assurance reports including the balances and expenditures for SONGS Unit 1 were supplied to the NRC (as required by 10 CFR

50.82(a)(8)(v)) annually (most recently in Reference 6) and balances for SONGS Units 2 and 3 were submitted on a biennial basis (as required by 10 CFR 50.75(f)(1)) (most recently in Reference 7). Reports regarding ISFSI costs and decommissioning funding assurance for these costs were summarized triennially as required by 10 CFR 72.30(c) (most recently in Reference 8). Going forward, balances and expenditures will be supplied annually to the NRC for all three units and the ISFSI.

An updated site-specific DCE will be concurrently submitted to the NRC. As summarized in Table 1, this plan is based on decommissioning and the termination of the license by 2051, approximately 38 years following the permanent cessation of operations. The summary in Table 1 includes the funds for dry storage through 2049 and final release of the ISFSI in 2051.

Tables 4A and 4B summarize the estimated annual spending for all decommissioning activities (License Termination, Spent Fuel Management, and Site Restoration), and combined NDT current balances in 2014 dollars. Table 2 reflects key tasks addressed by the NRC staff in a recent safety evaluation.

The total of all Nuclear Decommissioning Trust funds balances for SONGS Units 2 and 3 was $3,926 million as of December 31, 2013 (Reference 9). Evaluation of the projected cash flows assuming earnings on existing balances as permitted by NRC regulations demonstrates the adequacy of the existing funds to cover all aspects of decommissioning, including the costs of irradiated fuel management. This demonstrates that the balance in the decommissioning trust is adequate to fund all aspects of decommissioning as well as the costs of irradiated fuel management. As decommissioning proceeds the DCE will be updated as appropriate and annual updates of spending and trust fund balances will be docketed as required.

IV. Regulatory Activities

The IFMP assumes that the SONGS Participants will make withdrawals from their nuclear decommissioning trusts for spent fuel management purposes. The SONGS Participants have collected funds from ratepayers and accumulated funds in the nuclear decommissioning trusts for the purpose of funding three primary categories of costs: (1) License Termination; (2) Spent Fuel Management; and (3) Site Restoration. On November 18, 2013, SCE filed a Tier 3 Advice Letter (Reference 10) with the CPUC to obtain authorization for the use of funds in the near term and to establish processes for further CPUC oversight of withdrawals from the nuclear decommissioning trusts. On February 21, 2014, SDG&E filed a similar letter (Reference 14) with the CPUC. In addition to authorizing and overseeing the withdrawals, the CPUC is expected to

designate the specific amounts from the existing fund balances that are available for License Termination and therefore subject to 10 CFR 50.82(a)(8)(i)(A) and 10 CFR 50.75(h)(2). The fund balances would then be allocated to separate subaccounts within each trust fund and, as such, available for spent fuel management and site restoration, consistent with the requirements of 10 CFR 50.75, 10 CFR 50.82, and 10 CFR 72.30.

To confirm such access, SCE requested (Reference 11) an exemption from 10 CFR 50.75 and 50.82 to authorize the use of trust funds to pay for spent fuel management and site restoration including other transitional costs. The regulations limit the use of the nuclear trust fund to decommissioning costs. This exemption was granted on September 5, 2014 (Reference 12).

The SONGS Participants responsible for decommissioning will periodically review the amount of cash contributions required for the decommissioning fund to ensure that withdrawals do not inhibit the ability of the licensee to complete NRC License Termination, Spent Fuel Management, and Site Restoration. The SONGS Participants will obtain authorization as necessary through the ratemaking processes to provide for further contributions if required.

In accordance with 10 CFR 50.82(a)(8)(vii), SONGS will annually submit to the NRC by March 31st a report on the status of the funding for managing spent fuel. The report will include, current through the end of the previous calendar year, the amount of funds accumulated to cover the cost of managing the spent fuel, the projected cost of managing spent fuel until title to the fuel and possession of the fuel is transferred to the Secretary of Energy, and if the funds accumulated do not cover the projected cost, a plan to provide additional funding assurance using one of the methods allowed by NRC regulations.

V. References

1. Letter from P. Dietrich, Southern California Edison, to U.S. Nuclear Regulatory Commission, Subject: Dockets 50-361 and 50,362, Certification of Permanent Cessation of Power Operations, San Onofre Nuclear Generating Station Units 2 and 3, dated June 12, 2013

2. Letter from P. Dietrich, Southern California Edison, to U.S. Nuclear Regulatory Commission, Subject: Dockets 50-361 Permanent Removal of Fuel from Reactor Vessel, San Onofre Nuclear Generating Station, Unit 2, dated July 22, 2013

3. Letter from P. Dietrich, Southern California Edison, to U.S. Nuclear Regulatory Commission, Subject: Dockets 50-362 Permanent Removal of Fuel from Reactor Vessel, San Onofre Nuclear Generating Station, Unit 3, dated June 28, 2013

4. SONGS Units 2 and 3 Post-Shutdown Decommissioning Activities Report, San Onofre Nuclear Generating Station

5. Decommissioning Cost Estimate, 2013 Scenario, dated July 11, 2013, ABZ, Incorporated. Used in support of Nuclear Decommissioning Cost Triennial Proceeding, Exhibit SCE-12

6. Letter from Richard C. Brabec, Southern California Edison to U. S. Nuclear Regulatory Commission, Subject: 10 CFR 50.75(f)(1) and 10 CFR 50.82(a)(8)(v-vii) Decommissioning Funding Status Report San Onofre Nuclear Generating Station Unit 1 dated March 31, 2014

7. Letter from Richard C. Brabec, Southern California Edison to U. S. Nuclear Regulatory Commission, Subject: 10 CFR 50.75(f)(1) Decommissioning Funding Status Report, San Onofre Nuclear Generating Station Units 2 and 3 dated March 31, 2014

8. Letter from Douglas R. Bauder, Southern California Edison U. S. Nuclear Regulatory Commission , Subject: 10 CFR 72.30 ISFSI Decommissioning Funding Plan, San Onofre Nuclear Generating Station Units 1, 2 & 3 dated December 14, 2012

9. Letter from Richard C. Brabec, Southern California Edison to U.S. Nuclear Regulatory Commission, Subject: San Onofre Nuclear Generating Station, Units 2 and 3 Access to Nuclear Decommissioning Trust Funds, Supplemental Information, Dated March 12, 2014

10. Letter from Megan Scott-Kakures, Southern California Edison, to Public Utilities Commission of the State of California Energy Division Submitting a Tier 3 Advice Letter Requesting (1) Authorization of Disbursements from the Master Trusts for San Onofre Nuclear Generating Station; (2) Approval of Tier 2 Advice Letter to Process for Future Disbursements; (3) Designation of Trust Amounts Set Aside for License Termination; and (4) Approval of Balancing Account, dated November 18, 2013

11. Letter from Tom J. Palmisano, Southern California Edison, to U. S. Nuclear Regulatory Commission, Subject: San Onofre Nuclear Generating Station Units 2 and 3, Access to Nuclear Decommissioning Trust Funds, dated February 13, 2014

12. Letter from Thomas Wengert, Nuclear Regulatory Commission to Tom J. Palmisano, Southern California Edison, Granting Exemptions from the Requirements of 10 CFR 50, Sections 50.82(a)(8)(i)(A) and 50.75(h)(2) (TAC Nos. MF3544 an MF 3545) dated September 5, 2014

13. Testimony on Nuclear Decommissioning of SONGS 2 & 3 and Palo Verde, exhibit No. SCE-2, dated December 21, 2012

14. Letter from Clay Faber, San Diego Gas & Electric, to Public Utilities Commission of the State of California submitting a Tier 3 Advice Letter Requesting (1) Designation of SONGS 2&3 Costs Incurred During and After June 2013 As Decommissioning Costs Eligible for Payment with Trust Funds; (2) Authorization of Disbursements from the Master Trusts for San Onofre Nuclear Generating Station; (3) Approval of Tier 2 Advice Letter Process for Future Trust Disbursements; (4) Acknowledgement That Funds Have Been Collected From Ratepayers and Have Been Accumulating In The Trusts To Be Used for NRC and Non-NRC Jurisdictional Decommissioning Cost Categories; and (5) Designation of an Allocation of the SDG&E SONGS 2&3 Trusts Among the Major Decommissioning Cost Categories, dated February 21, 2014

15. EnergySolutions Document No. 164001, "2014 Decommissioning Cost Analysis of the San Onofre Nuclear Generating Station Units 2 and 3"

SONGS Units 2 and 3 Irradiated Fuel Management Plan

Table 1

Irradiated Fuel Management Plan – Summary Schedule

Cost and Schedule Summary (2014 Dollars in thousands)							
Spent Fuel 10 CFR 50.54(bb)							
Period No.	**Period Description**	**Start**	**End**	**Years**	**Unit 2 Cost**	**Unit 3 Cost**	**Total Cost**
SNF Pd 1	Spent Fuel Management Transition	6/7/2013	12/31/2013	0.56	$63,891	$66,105	$129,997
SNF Pd 2	Spent Fuel Transfer to Dry Storage	1/1/2014	6/1/2019	5.41	$344,629	$372,193	$716,822
SNF Pd 3	Dry Storage During Decommissioning – Units 1, 2 and 3	6/1/2019	12/5/2031	12.51	$61,425	$61,425	$122,849
SNF Pd 4	Dry Storage Only – Units 1, 2 and 3	12/5/2031	12/31/2035	4.07	$29,383	$29,383	$58,765
SNF Pd 5	Dry Storage Only – Units 2 and 3	12/31/2035	12/31/2049	14.00	$107,326	$107,326	$214,653
SNF D&D Pd 1	ISFSI License Termination	12/31/2049	5/6/2050	0.34	$1,260	$1,260	$2,520
SNF D&D Pd 2	ISFSI Demolition	5/6/2050	9/8/2051	1.34	$15,295	$15,295	$30,590
	Category Total			**38.23**	**$623,209**	**$652,987**	**$1,276,196**

Table 2
Major Fuel Management Tasks

Major Fuel Management Task Direct Costs (Note 1)	Explanatory or Additional Details	Estimate in DCE (in Thousands)	Schedule in DCE
Estimated Costs to isolate spent fuel pools and fuel handling systems	• Estimated cost for Islanding • No additional costs are required for fuel handling systems. Cranes are single-failure proof	$ 22,183 (Note 2)	6/2015
Estimated cost to construct an ISFSI or a combination of wet/dry storage	• ISFSI in operation; so, current costs are for wet/dry combination. • Costs are associated with capacity expansion (pad and associated facility costs, DSCs and HSMs).	$ 396,391 (Note 3)	6/2019
Estimated annual cost for the operation of the selected option	• Operational and maintenance costs are NOT readily separable (fuel storage support vice other demands); but, are included in Table 4 cash flows.	N/A	Ongoing
Estimated cost for preparation, packaging and shipping of fuel to DOE	• Off-site transportation costs are part of contract with US DOE.	$ 6,742 (Note 4)	Thru 12/2049
Estimated cost to decommission the ISFSI	• Funded from both Unit 1 and Units 2&3 Decommissioning Trust Funds.	$ 33,110 (Note 5)	2049-2051
Brief discussion of selected storage method or methods and estimated time frame for these activities	• See Section II for selected methods. • See Table 1 for time frames.	N/A	N/A

Notes:

1. Tasks from NRC Safety Evaluation (SE) on Kewaunee Integrated Fuel Management Plan dated, September 28, 2009, publically available under ADAMS Accession No. ML092321079
2. Cost based on DCE, DECON Pd 2, Items 2.23 through 2.30
3. Cost based on DCE, SNF Pd 2, Items 8.05 through 8.13
4. Cost based on SNF Pd 4 and SNF Pd 5, Item 2.03
5. Cost based on DCE, total of SNF D&D Pd 1 and SNF Pd 2

SONGS Units 2 and 3 Irradiated Fuel Management Plan

Table 3

SONGS Unit 2 & Unit 3
Spent Fuel Shipping Schedule
2024 DOE Acceptance

	On-Site Inventory (Beginning of the Year)				On-Site Transfers (During Year)		Off-Site Transfers (During Year)			
Year	Unit 2 & 3 Fuel Assemblies in Wet Storage	Units 2 & 3 Fuel Assemblies in Dry Storage	Units 2 & 3 Fuel Assemblies in On-Site Storage	Units 2 &3 Canisters in ISFSI	Unit 2 & 3 Fuel Assemblies Transferred to ISFSI	Unit 2 & 3 Canisters Transferred to ISFSI	Unit 2 Assemblies Transferred to DOE	Unit 3 Assemblies Transferred to DOE	Unit 2 & 3 Assemblies Transferred to DOE	Unit 2 & 3 Canisters Transferred to DOE
2014	2668	792	3460	33	0	0	0	0	0	0
2015	2668	792	3460	33	0	0	0	0	0	0
2016	2668	792	3460	33	0	0	0	0	0	0
2017	2668	792	3460	33	768	24	0	0	0	0
2018	1900	1560	3460	57	1536	48	0	0	0	0
2019	364	3096	3460	105	364	13	0	0	0	0
2020	0	3460	3460	118	0	0	0	0	0	0
2021	0	3460	3460	118	0	0	0	0	0	0
2022	0	3460	3460	118	0	0	0	0	0	0
2023	0	3460	3460	118	0	0	0	0	0	0
2024	0	3460	3460	118	0	0	0	0	0	0
2025	0	3460	3460	118	0	0	0	0	0	0
2026	0	3460	3460	118	0	0	0	0	0	0
2027	0	3460	3460	118	0	0	0	0	0	0
2028	0	3460	3460	118	0	0	0	0	0	0
2029	0	3460	3460	118	0	0	0	0	0	0
2030	0	3460	3460	118	0	0	48	48	96	4
2031	0	3364	3364	114	0	0	192	96	288	12
2032	0	3076	3076	102	0	0	120	120	240	10
2033	0	2836	2836	92	0	0	0	96	96	4
2034	0	2740	2740	88	0	0	112	120	232	8
2035	0	2508	2508	80	0	0	96	96	192	6
2036	0	2316	2316	74	0	0	128	96	224	7
2037	0	2092	2092	67	0	0	0	0	0	0
2038	0	2092	2092	67	0	0	96	128	224	7
2039	0	1868	1868	60	0	0	96	96	192	6
2040	0	1676	1676	54	0	0	96	96	192	6
2041	0	1484	1484	48	0	0	0	0	0	0
2042	0	1484	1484	48	0	0	96	96	192	6
2043	0	1292	1292	42	0	0	96	96	192	6
2044	0	1100	1100	36	0	0	96	96	192	6
2045	0	908	908	30	0	0	128	96	224	7
2046	0	684	684	23	0	0	96	128	224	7
2047	0	460	460	16	0	0	96	230	326	11
2048	0	134	134	5	0	0	0	0	0	0
2049	0	134	134	5	0	0	134	0	134	5
2050	0	0	0	0	0	0	0	0	0	0

Note: The number of canisters listed are for storage of irradiated fuel not GTCC waste.

Table 4A
SONGS Unit 2
Decommissioning Funding Plan

Year	Radiological Decontamination	Spent Fuel Management	Site Restoration	Total Decommissioning Costs	Available Funds
2013	$25,749	$63,891	$49,067	$138,706	$1,847,000
2014	$79,799	$35,719	$15,089	$130,607	
2015	$69,196	$106,308	$7,439	$182,943	
2016	$54,541	$59,308	$3,730	$117,579	
2017	$111,903	$59,308	$1,957	$173,168	
2018	$47,520	$59,308	$0	$106,828	
2019	$108,328	$27,554	$13,539	$149,420	
2020	$185,482	$4,908	$36	$190,426	
2021	$79,081	$4,908	$36	$84,026	
2022	$54,785	$4,908	$1,927	$61,621	
2023	$158,207	$4,908	$36	$163,151	
2024	$37,930	$4,908	$16,848	$59.687	
2025	$2,922	$4,908	$44,621	$52,451	
2026	$2,922	$4,908	$19,412	$27,243	
2027	$2,922	$4,908	$22,469	$30,299	
2028	$2,922	$4,908	$31,688	$39,518	
2029	$2,922	$4,908	$66,873	$74,704	
2030	$2,922	$4,908	$71,867	$79,697	
2031	$2,055	$5,089	$23,181	$30.325	
2032	$2,122	$7,214	$0	$9,336	
2033	$0	$7,214	$0	$7,214	
2034	$0	$7,214	$0	$7,214	
2035	$0	$7,228	$0	$7,228	
2036	$0	$7,665	$0	$7,665	
2037	$0	$7,665	$0	$7,665	
2038	$0	$7,665	$0	$7,665	
2039	$0	$7,665	$0	$7,665	
2040	$0	$7,665	$0	$7,665	
2041	$0	$7,665	$0	$7,665	
2042	$0	$7,665	$0	$7,665	
2043	$0	$7,665	$0	$7,665	
2044	$0	$7,665	$0	$7,665	
2045	$0	$7,665	$0	$7,665	
2046	$0	$7,665	$0	$7,665	
2047	$0	$7,665	$0	$7,665	
2048	$0	$7,665	$0	$7,665	
2049	$0	$7,667	$0	$7,667	
2050	$0	$9,974	$20,177	$30,151	
2051	$0	$6,573	$11,928	$18,500	
2052	$0	$0	$1,377	$1,377	

Notes: Costs are in 2014 dollars (in thousands) and are not escalated from the base year
SONGS Unit 2 Trust fund balances at end of 2013 were $1,847,000

Table 4B
SONGS Unit 3
Decommissioning Funding Plan

Year	Radiological Decontamination	Spent Fuel Management	Site Restoration	Total Decommissioning Costs	Available Funds
2013	$26,566	$66,105	$49,067	$141,739	$2,079,400
2014	$78,964	$40,156	$15,969	$135,089	
2015	$74,096	$112,024	$9,390	$195,509	
2016	$61,451	$64,405	$25,227	$151,083	
2017	$40,631	$64,405	$3,799	$108,835	
2018	$86,348	$64,405	$0	$150,753	
2019	$96,521	$29,675	$13,908	$140.014	
2020	$120,873	$4,908	$2,135	$127,916	
2021	$194,090	$4,908	$575	$199,574	
2022	$135,313	$4,908	$2,467	$142,688	
2023	$114,581	$4,908	$1,511	$121,000	
2024	$26,874	$4,908	$36,778	$68,560	
2025	$2,922	$4,908	$40,655	$48,485	
2026	$2,922	$4,908	$21,676	$29,507	
2027	$2,922	$4,908	$25,848	$33,678	
2028	$2,922	$4,908	$20,945	$28,776	
2029	$2,922	$4,908	$117,321	$125,151	
2030	$2,922	$4,908	$116,672	$124,503	
2031	$2,055	$5,089	$25,501	$32,645	
2032	$2,122	$7,214	$0	$9,336	
2033	$0	$7,214	$0	$7,214	
2034	$0	$7,214	$0	$7,214	
2035	$0	$7,228	$0	$7,228	
2036	$0	$7,665	$0	$7,665	
2037	$0	$7,665	$0	$7,665	
2038	$0	$7,665	$0	$7,665	
2039	$0	$7,665	$0	$7,665	
2040	$0	$7,665	$0	$7,665	
2041	$0	$7,665	$0	$7,665	
2042	$0	$7,665	$0	$7,665	
2043	$0	$7,665	$0	$7,665	
2044	$0	$7,665	$0	$7,665	
2045	$0	$7,665	$0	$7,665	
2046	$0	$7,665	$0	$7,665	
2047	$0	$7,665	$0	$7,665	
2048	$0	$7,665	$0	$7,665	
2049	$0	$7,667	$0	$7,667	
2050	$0	$9,974	$23,120	$33,094	
2051	$0	$6,573	$45,566	$52,139	
2052	$0	$0	$1,377	$1,377	

Notes: Costs are in 2014 dollars (in thousands) and are not escalated from the base year
SONGS Unit 3 Trust Fund balances at end of 2013 were $2,079,400

TAB 6

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Thomas J. Palmisano
Vice President & Chief Nuclear Officer

10 CFR 50.82(a)(4)(i)

September 23, 2014

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington D.C. 20555-0001

Subject: **Docket Nos. 50-361 and 50-362,**
San Onofre Nuclear Generating Station, Units 2 and 3
Site Specific Decommissioning Cost Estimate

References:

1. Letter from P. T. Dietrich (SCE) to the U.S. Nuclear Regulatory Commission dated June 12, 2013; Subject: Certification of Permanent Cessation of Power Operations San Onofre Nuclear Generating Station, Units 2 and 3

2. Letter from Thomas J. Palmisano (SCE) to the U.S. Nuclear Regulatory Commission dated February 13, 2014; Subject: Access to Nuclear Decommissioning Trust Funds, San Onofre Nuclear Station, Units 2 and 3

3. Letter from Richard C. Brabec (SCE) to the U.S. Nuclear Regulatory Commission dated March 12, 2014; Subject: Access to Decommissioning Trust Funds, San Onofre Nuclear Generating Station Units 2 and 3

4. Letter from Richard C. Brabec (SCE) to the U.S. Nuclear Regulatory Commission dated March 31, 2014; Subject: 10 CFR 50.75(f)(1) Decommissioning Funding Status Report, San Onofre Nuclear Generating Station Units 2 and 3

Dear Sir or Madam:

On June 12, 2013, in accordance with 10 CFR 50.82(a)(1)(i), Southern California Edison (SCE) submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) (Reference 1) certifying the permanent cessation of operations at San Onofre Nuclear Generating Station (SONGS), Units 2 and 3. In accordance with 10 CFR 50.54(bb) and 10 CFR 50.82(a)(4)(i), SCE is required to submit an Irradiated Fuel Management Plan (IFMP), Site Specific Decommissioning Cost Estimate (DCE) and Post-Shutdown Decommissioning Activities Report (PSDAR) within two years of permanent cessation of operations.

The SONGS, Units 2 and 3 DCE is attached. The SONGS, Units 2 and 3 IFMP and PSDAR are being concurrently submitted under separate cover letters. The DCE provides more current estimates of annual cash flow than were previously provided in the Nuclear Decommissioning Trust Fund Exemption Request (References 2 and 3) and annual funding assurance update (Reference 4). Future filings with the California Public Utilities Commission will be based on the SONGS, Units 2 and 3 DCE and subsequent revisions.

P.O. Box 128
San Clemente, CA 92672
(949) 368-6575 PAX 86575
Fax: (949) 368-6183
Tom.Palmisano@sce.com

A001
NRR

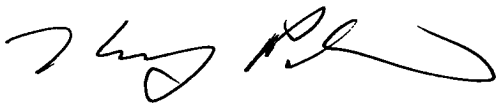
The descriptions of decommissioning activities and phases in the DCE are consistent with those described in the PSDAR. Both the DCE and PSDAR represent SCE's current plans and are subject to change as the project progresses. Much of the third-party contracting activities associated with decommissioning are underway but have not been finalized. As contracts are finalized and SCE progresses through the actual work of the decommissioning project, various risks will be realized or avoided and contingencies adjusted, accordingly.

Changes to significant details will be included in subsequent revisions to the DCE as required by 10 CFR 50.54(bb). Financial assurance information will be provided on an annual basis as required by 10 CFR 50.75(f)(1).

This letter does not contain any new commitments.

If there are any questions or if additional information is needed, please contact me or Ms. Andrea Sterdis at (949) 368-9985.

Sincerely,



Enclosure: San Onofre Nuclear Generating Station Units 2 and 3 Site Specific Decommissioning Cost Estimate

cc: M. L. Dapas, Regional Administrator, NRC Region IV
T. J. Wengert, NRC Project Manager, San Onofre Units 2 and 3 Decommissioning
R. E. Lantz, NRC Region IV, San Onofre Units 2 and 3
G. G. Warrick, NRC Senior Resident Inspector, San Onofre Units 2 and 3
S. Y. Hsu, California Department of Health Services, Radiologic Health Branch

ENERGY*SOLUTIONS* **Document No. 164001-DCE-001**

2014 Decommissioning Cost Analysis of the San Onofre Nuclear Generating Station Units 2 & 3

Project No. 164001 **Rev 1**

Prepared for:
Southern California Edison.
2244 Walnut Grove Avenue
Rosemead, CA 91770

Prepared by:
Energy*Solutions*, LLC
100 Mill Plain Road
Mailbox No. 106
Danbury, CT 06811

Authored By:	Michael S. Williams, Project Manager	September 5, 2014 Date
Reviewed By:	Barry S. Sims, Technical Advisor	September 5, 2014 Date
Approved By	Michael S. Williams, Project Manager	September 5, 2014 Date

- [ ] New Report
- [ ] Title Change
- [x] Report Revision
- [ ] Report Rewrite

Effective Date: Sept 5, 2014

SONGS UNIT-2 AND UNIT-3
DECOMMISSIONING COST ESTIMATE
DESCRIPTION OF REVISION

MAJOR REVISION _____ MINOR REVISION_X____
REVISION NUMBER – 1 EFFECTIVE DATE - 9/5/2014

The revisions contained in this MINOR REVISION to the SONGS Unit-2 and Unit-3 Decommissioning Cost Estimate are minor in nature and do not revise or otherwise impact the content or results of the cost estimate.

ITEM-1

A new Appendix-F is added to the DCE at the request of San Diego Gas & Electric Company (SDG&E) in order to provide information regarding its internal decommissioning costs which it expects to incur and to fund on its own behalf in addition to its 20% share of the Decommissioning Cost Estimate.

ITEM-2

The APPENDICES section of the DCE Table of Contents is revised to include the new APPENDIX-F SDG&E SONGS Decommissioning Costs (100%)

ITEM-3

Within the narrative section of the DCE the various appearances of the term "utility staff" have been revised to include a parenthetic statement "(Licensee)" to clarify that the utility staff means the NRC Licensee.

ITEM-4

On Table 6-1 "Cost and Schedule Summary" the title block for SPENT FUEL is revised to include "(72.30)" since this section also contains cost elements associated with ISFSI decommissioning.

ITEM-5

Added new SDG&E footnote for Table 1-1 referring to Appendix F

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

Appendix A	List of Systems and Structures
Appendix B	Spent Fuel Shipping Schedule
Appendix C	Detailed Project Schedule
Appendix D	Detailed Cost Table
Appendix E	Annual Cash Flow Table
Appendix F	SDG&E SONGS Decommissioning Costs (100%)

ACRONYMS AND ABBREVIATIONS

AHSM	Advanced Horizontal Storage Modules
AIF	Atomic Industrial Forum
ALARA	As Low As Reasonably Achievable
ARO	Asset Retirement Obligation
CFR	Code of Federal Regulations
CPM	Critical Path Method
DAW	Dry Active Waste
DGC	Decommissioning General Contractor
DOE	U.S. Department of Energy
DSC	Dry Shielded Canister
ESS	Essential System
FEMA	Federal Emergency Management Agency
FSS	Final Status Survey
FTE	Full Time Equivalent
GSA	U.S. General Services Administration
GTCC	Greater Than Class C
HP	Health Physics
ISFSI	Independent Spent Fuel Storage Installation
LLRW	Low-Level Radioactive Waste
LLW	Low Level Waste
LLWPA	Low-Level Waste Policy Act
LOP	Life-of-Plant
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MPC	Multi-Purpose Canister
MWt	Megawatt thermal
NON	Non-Essential System
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
ORISE	Oak Ridge Institute for Science and Education
PCB	Polychlorinated Biphenyl
PGE	Pacific Gas & Electric
PSDAR	Post-Shutdown Decommissioning Activities Report
PWR	Pressurized Water Reactor
RIF	Reduction In Force
SCE	Southern California Edison
SONGS	San Onofre Nuclear Generating Station
STRUCT	Structure
TCEQ	Texas Commission on Environmental Quality
WBS	Work Breakdown Structure
WCS	Waste Control Specialists LLC
UCF	Unit Cost Factor

1.0 EXECUTIVE SUMMARY

This report presents the 2014 Decommissioning Cost Estimate (DCE) Study of the San Onofre Nuclear Generating Station (SONGS) Units 2 & 3, hereinafter referred to as the 2014 Cost Study. The San Onofre Nuclear Generating Station is operated by the Southern California Edison Company (SCE).

On June 7, 2013, SCE announced its intention to permanently cease power generation operations and shut down SONGS Units 2 & 3. Units 2 & 3 had not produced power since January 9, 2012 and January 31, 2012, respectively. SCE now has the responsibility to decommission the site. In January 2014 SCE contracted with Energy*Solutions* to evaluate decommissioning alternatives and assist in the development of a detailed project schedule and DCE to support the preparation and submittal of a Post Shutdown Decommissioning Activities Report (PSDAR) in accordance with 10 CFR 50.82(a)(4)(i), which requires that a PSDAR be submitted within two years following the permanent cessation of operations.

This study has been performed to furnish an estimate of the costs for: (1) decommissioning SONGS Units 2 & 3 to the extent required to terminate the plant's operating license pursuant to 10 CFR 50.75(c); (2) post-shutdown management of spent fuel until acceptance by the U.S. Department of Energy (DOE) pursuant to 10 CFR 50.54(bb); (3) demolition of uncontaminated structures and restoration of the site in accordance with the United States Department of Navy Grant of Easement (Ref. No. 14); and the California State Lands Commission Easement Lease (Ref. No. 15); and (4) Independent Spent Fuel Storage Installation (ISFSI) decommissioning pursuant to 10 CFR 72.30. This study includes SCE's actual costs incurred in the transitional periods following cessation of permanent operations on June 7, 2013 until December 31, 2013. Costs presented herein commencing on January 1, 2014 are estimated.

SCE's December 2012 testimony to the CPUC provided the basis for the current spent fuel management costs. SCE is continuing to review available information from the DOE to determine if the DOE start date assumption of 2024 requires updating. The DCE will be revised accordingly as new information becomes available.

Accordingly, the costs and schedules for all activities are segregated for regulatory purposes as follows: costs for "License Termination" (10 CFR 50.75(c)); costs for "Spent Fuel Management" (10 CFR 50.54(bb)); costs for "Site Restoration" (clean removal and site restoration) final site conditions; and costs for "ISFSI Decommissioning" (10 CFR 72.30). Energy*Solutions* has established a Work Breakdown Structure (WBS) and cost accounting system to differentiate between these project accounts.

This study analyzes the following technical approach to decommissioning as defined by SCE:

- DECON methodology.
- Permanent cessation of operations on June 7, 2013.
- Termination of spent fuel pool operation six years after permanent shutdown.
- Spent fuel will be stored in Multi-Purpose Canisters (MPCs) at an on-site Independent Spent Fuel Storage Installation (ISFSI).

- A dry transfer facility will not be necessary for transfer of SNF canisters for transport.
- DOE begins accepting spent fuel from the industry in 2024 and completes the removal of all SONGS spent fuel by 2049.
- Decommissioning will be performed by a Decommissioning General Contractor (DGC) with oversight by the SONGS participants.
- Incorporation of Life-of-Plant (LOP) Disposal Rates for Class A Low-Level Radioactive Waste (LLRW).
- Incorporation of disposal rates for Class B and C LLRW based on recent quotes for disposal at the Waste Control Specialists LLC (WCS) site in Andrews County, Texas.

The cost estimate results are provided in Table 1-1. Table 1-1 gives License Termination costs (which correspond to 10 CFR 50.75 (c) requirements); Spent Fuel Management costs (which correspond to 10 CFR 50.54 (bb) requirements); and Site Restoration costs (which correspond to activities such as clean building demolition and site grading and end-state preparation as required under the Site Easement).

Table 1-1
Decommissioning Cost Summary[12]
(2014 Dollars in Thousands)

Cost Account	Unit 2	Unit 3	Total
License Termination 50.75(c)	$1,034,230	$1,078,016	**$2,112,246**
Spent Fuel Management 50.54(bb)	$623,209	$652,987	**$1,276,196**
Site Restoration	$423,297	$599,507	**$1,022,804**
Totals	**$2,080,735**	**$2,330,511**	**$4,411,246**

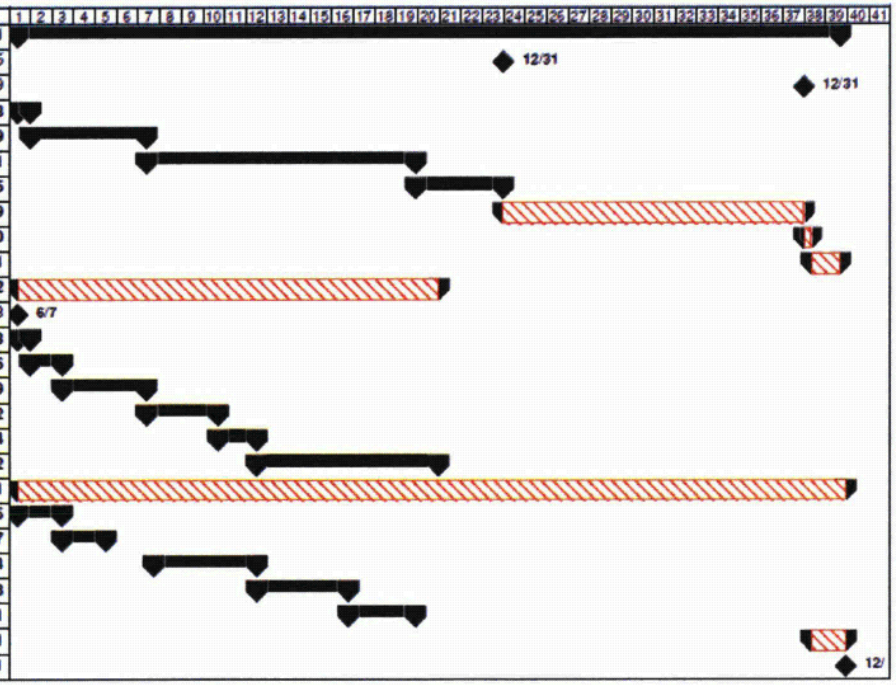
The estimate is based on site-specific plant systems and buildings inventories. These inventories, and Energy*Solutions*' proprietary Unit Cost Factors (UCFs), were used to generate required manhours, activity schedule hours and costs, and waste volume, weight, and classification. Based on the activity schedule hours and a decommissioning activities analysis, a Critical Path Method (CPM) analysis was performed to determine the decommissioning schedules. These schedules reflect the effects of sequenced activity-dependent or distributed decommissioning elements such as planning and preparations, major component removal, building decontamination, and spent fuel shipping. The schedules are divided into project phases (periods) and presented, as noted previously, by cost account "License Termination," "Spent Fuel Management," or "Site Restoration." The summary is shown in Figure 1-1, and may also be found in Section 6.0 of this report.

[1] In addition, the Decommissioning Cost Summary in Table 1-1 does not include separate internal costs that San Diego Gas & Electric Company (SDG&E) has indicated that it expects to incur. SDG&E provides information regarding these costs in Appendix F
[2] Rows and columns may not add correctly due to rounding.

Figure 1-1
Summary Schedule

DECON with Dry Storage, 2013 Shutdown and DOE Acceptance in 2024

Task Name	Start	Finish
Post-Shutdown Spent Fuel Management	06/07/2013	09/08/2051
Spent Fuel Shipping Complete - Unit 1	12/31/2035	12/31/2035
Spent Fuel Shipping Complete - Units 2 & 3	12/31/2049	12/31/2049
SNF Pd 1 - Spent Fuel Management Transition	06/07/2013	12/31/2013
SNF Pd 2 - Spent Fuel Transfer to Dry Storage	1/1/2014	06/01/2019
SNF Pd 3 - Dry Storage During Decommissioning - Units 1, 2 and 3	06/01/2019	12/05/2031
SNF Pd 4 - Dry Storage Only - Units 1, 2 and 3	12/05/2031	12/31/2035
SNF Pd 5 - Dry Storage Only - Units 2 and 3	12/31/2035	12/31/2049
SNF D&D Pd 1 - ISFSI D&D Planning	12/31/2049	05/06/2050
SNF D&D Pd 2 - ISFSI D&D	05/06/2050	09/08/2051
Part 50 License Termination	06/07/2013	12/24/2032
Announcement of Cessation of Operations (June 7, 2013)	06/07/2013	06/07/2013
Decon Pd 1 - Transition to Decommissioning	06/07/2013	12/31/2013
Decon Pd 2 - Decommissioning Planning and Site Modifications	1/1/2014	06/30/2015
Decon Pd 3 - Decommissioning Preparations and Reactor Internals Segmentation	06/30/2015	06/01/2019
Decon Pd 4 - Plant Systems and Large Component Removal	06/01/2019	09/24/2022
Decon Pd 5 - Building Decontamination	09/24/2022	07/13/2024
Decon Pd 6 - License Termination During Demolition	07/13/2024	12/24/2032
Site Restoration	06/07/2013	12/15/2051
SR Pd 1 - Transition to Site Restoration	06/07/2013	06/30/2015
SR Pd 2 - Building Demolition During Decommissioning	06/30/2015	07/11/2017
SR Pd 3 - Subsurface Demolition Engineering and Permitting	10/01/2019	07/13/2024
SR Pd 4 - Building Demolition to 3 Feet Below Grade	07/13/2024	10/14/2028
SR Pd 5 - Subgrade Structure Removal Below -3 Feet	10/14/2028	12/05/2031
SR Pd 6 - Final Site Restoration and Lease Termination	05/06/2050	12/15/2051
Final Easement Termination	12/15/2051	12/15/2051



2.0 INTRODUCTION

2.1 Study Objective

This report presents the 2014 Decommissioning Cost Estimate Study of the San Onofre Nuclear Generating Station (SONGS) Units 2 & 3, hereinafter referred to as the 2014 Cost Study. The San Onofre Nuclear Generating Station is owned by the Southern California Edison Company (SCE), San Diego Gas & Electric Company, and the City of Riverside. A former owner, the City of Anaheim, also has liability for decommissioning. SCE has provided the following information regarding the liability by owner for SONGS decommissioning costs:

Cost Categories	Owners			
	SDG&E	Riverside	Anaheim	SCE
SONGS 1	20%	0%	0%	80%
SONGS 2	20%	1.79%	2.4737%	75.7363%
SONGS 3	20%	1.79%	2.4625%	75.7475%
Common Facilities (Units 2 & 3)	20%	1.79%	2.4681%	75.7419%
SONGS 1 Fuel	20%	0%	0%	80%
SONGS 2/3 Fuel	20%	1.79%	2.3398%	75.8702%
ISFSI Maintenance and D&D	20%	1.6066%	2.2686%	76.1248%
San Diego Switchyard	100%	0%	0%	0%
Edison Switchyard	0%	0%	0%	100%
Interconnection Facilities	50%	0%	0%	50%
Nuclear Fuel Cancellation Charges	20%	1.79%	0%	78.21%

This study has been performed to support the development of a site-specific PSDAR and furnish an estimate of the costs for (1) decommissioning SONGS Units 2 & 3 to the extent required to terminate the plant's operating license, (2) post-shutdown management of spent fuel until acceptance by the U.S. Department of Energy (DOE), (3) demolition of uncontaminated structures and restoration of the site in accordance with the U.S. Department of Navy Grant of Easement (Ref. No. 14), and the California State Lands Commission Easement Lease (Ref. No. 15), and (4) Independent Spent Fuel Storage Installation (ISFSI) decommissioning. This study also includes SCE's actual costs incurred in the transitional periods following cessation of permanent operations until December 31, 2013. Estimated costs begin on January 1, 2014.

The study methodology follows the basic approach originally presented in the Atomic Industrial Forum/National Environmental Studies Project Report AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," (Ref. No. 2). The report was prepared in accordance with Nuclear Regulatory Commission (NRC) Regulatory Guide 1.202, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," (Ref. No. 3). The estimate is based on compliance with current regulatory requirements and proven decommissioning technologies.

NRC requirements, set forth in Title 10 of the Code of Federal Regulations (CFR), differentiate between the post-shutdown costs associated with the decommissioning of the nuclear plant facility, those associated with storage of spent fuel on-site, and those associated with the decommissioning of the spent fuel storage facility. The Code of Federal Regulations, however, does not address the entire scope of the decommissioning liability for each nuclear facility. 10 CFR 50.75(c) requires funding by the licensee(s) of the facility for the decommissioning program, but specifically excludes the cost of removal and disposal of spent fuel and structures that do not require disposal as radioactive material. 10 CFR 50.75(c) also excludes the cost of site restoration activities that do not involve the removal of residual radioactivity necessary to terminate the NRC license(s). 10 CFR 50.54 (bb) requires funding by the licensee(s) "for the management of all irradiated fuel at the reactor upon expiration of the reactor operating license(s) until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository." 10 CFR 72.30 requires funding for decommissioning of the on-site spent fuel storage facility after the irradiated fuel is accepted by the DOE.

In addition to the NRC Decommissioning requirements described above, the Site Easements require the demolition and removal of all improvements installed on both the on-shore and off-shore sites, including all substructures regardless of depth, and site restoration to the satisfaction of the Grantors.

This study analyzes the following technical approach to decommissioning as defined by SCE and the co-owners:

- DECON methodology.
- Permanent cessation of operations and commencement of decommissioning planning on June 7, 2013.
- Termination of spent fuel pool operation within six years after permanent shutdown.
- Spent fuel will be stored in transportable Multi-Purpose Canisters (MPCs) at an on-site Independent Spent Fuel Storage Installation (ISFSI).
- A dry transfer facility will not be necessary for transfer of SNF canisters for transport.
- DOE begins accepting spent fuel from the industry in 2024 and completes the removal of all SONGS spent fuel by 2049.
- Decommissioning will be performed by a Decommissioning General Contractor (DGC) with oversight by the SONGS participants.

In addition, this study includes the following assumptions:

- Incorporation of Energy*Solutions*' Life-of-Plant (LOP) Disposal Rates for Class A Low-Level Radioactive Waste (LLRW), (Ref. No. 7).
- Incorporation of disposal rates for Class B and C LLRW based on recent quotes for disposal at the Waste Control Specialists LLC (WCS) site in Andrews County, Texas.

2.2 Regulatory Framework

Provisions of current laws and regulations affecting decommissioning, waste management, and spent fuel management are as follows:

1. NRC regulations require a license for on-site storage of spent fuel. Wet storage in a spent fuel pool is authorized by a facility's 10 CFR Part 50 license. On-site dry storage of spent fuel at an Independent Spent Fuel Storage Installation (ISFSI) is licensed by either: (a) the general license set forth in 10 CFR 72.210, which requires that a Part 50 license be in place; or (b) a site-specific ISFSI license issued pursuant to 10 CFR Part 72.

2. 10 CFR 50.75(c) requires funding by the licensee(s) of the facility for decommissioning.

3. 10 CFR 50.54 (bb) requires the licensee(s), within two years following permanent cessation of operation of the reactor or five years before expiration of the operating license(s), whichever occurs first, to submit written notification to the NRC for its review and preliminary approval of the program by which the licensee intends to manage and provide funding "for the management of all irradiated fuel at the reactor upon expiration of the reactor operating license until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository."

4. 10 CFR 961 (Ref. No. 4), Appendix E, requires spent fuel to be cooled for at least five years before it can be accepted by DOE as "standard spent fuel."

5. 10 CFR 72.30 requires funding by the licensee(s) for termination of the ISFSI license.

Decommissioning Alternatives

The three basic methods for decommissioning are DECON, SAFSTOR, and ENTOMB, which are summarized as follows:

1. DECON: The equipment, structures, and portions of the facility and site that contain radioactive contaminants are promptly removed or decontaminated to a level that permits termination of the license after cessation of operations.

2. SAFSTOR: The facility is placed in a safe, stable condition and maintained in that state (safe storage). The facility is decontaminated and dismantled at the end of the storage period to levels that permit license termination. NRC regulations require decommissioning to be completed within 60 years of cessation of operation.

3. ENTOMB: Radioactive structures, systems, and components are encased in a structurally long-lived substance, such as concrete. The entombed structure is appropriately maintained and monitored until radioactivity decays to a level that permits termination of the license. Since entombment will exceed the requirement

for decommissioning to be completed within 60 years of cessation of operation, NRC handles entombment requests on a case-by-case basis.

Post-Shutdown Spent Fuel Management Alternatives

The options for long-term post-shutdown spent fuel management currently available to power plant operators are (1) wet storage consisting of continued maintenance and operation of the spent fuel pool, and (2) dry storage consisting of transfer of spent fuel from the fuel pool to on-site dry storage modules after a cooling period or any combination of the two as is the present case at SONGS. Maintaining the spent fuel pool for an extended duration following cessation of operations prevents termination of the Part 50 license and typically has a higher annual maintenance and operating cost than the dry storage alternative. Transfer of spent fuel to an ISFSI requires additional expenditures for purchase and construction of the ISFSI and dismantlement and disposal of the ISFSI following completion of spent fuel transfer to DOE.

The spent fuel shipping schedules furnished by SCE for this study are based on projections that DOE will commence accepting spent fuel from domestic commercial nuclear power plants in 2024, and that the DOE will accept spent fuel at the rate published in DOE's July 2004 Acceptance Priority Ranking & Annual Capacity Report (DOE/RW-0567) (Ref. No. 12). These assumptions are in accordance with SCE testimony to the Public Utilities Commission of the State of California (Ref. No. 17). Additionally, SCE is reviewing available information from the DOE to determine if the DOE start date assumption requires updating. The DCE will be revised accordingly as new information becomes available.

TAB 7

March 3, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Atomic Safety and Licensing Board

Before Administrative Judges:
Thomas S. Moore, Chairman
Paul S. Ryerson
Richard E. Wardwell

In the Matter of	)	Docket No. 63-001
U.S. DEPARTMENT OF ENERGY	)	ASLBP No. 09-892-HLW-CAB04
(High-Level Waste Repository)	)	

U.S. DEPARTMENT OF ENERGY'S MOTION TO WITHDRAW

The United States Department of Energy ("DOE") hereby moves, pursuant to 10 C.F.R. § 2.107, to withdraw its pending license application for a permanent geologic repository at Yucca Mountain, Nevada. DOE asks the Board to dismiss its application with prejudice and to impose no additional terms of withdrawal.

While DOE reaffirms its obligation to take possession and dispose of the nation's spent nuclear fuel and high-level nuclear waste, the Secretary of Energy has decided that a geologic repository at Yucca Mountain is not a workable option for long-term disposition of these materials. Additionally, at the direction of the President, the Secretary has established the Blue Ribbon Commission on America's Nuclear Future, which will conduct a comprehensive review

and consider alternatives for such disposition.[1] And Congress has already appropriated $5 million for the Blue Ribbon Commission to evaluate and recommend such "alternatives." Energy and Water Development and Related Agencies Appropriations Act, 2010, Pub. L. No. 111-85, 123 Stat. 2845, 2864-65 (2009). In accord with those decisions, and to avoid further expenditure of funds on a licensing proceeding for a project that is being terminated, DOE has decided to discontinue the pending application in this docket,[2] and hereby moves to withdraw that application with prejudice.

Under the Nuclear Waste Policy Act of 1982, as amended, 42 U.S.C. §§ 10101 *et seq.* ("NWPA"), this licensing proceeding must be conducted "in accordance with the laws applicable to such applications . . . ." NWPA § 114(d), 42 U.S.C. § 10134(d). Those laws necessarily include the NRC's regulations governing license applications, including, as this Board has already recognized, 10 C.F.R. § 2.107(a). *See* CAB Order (Concerning LSNA Memorandum), ASLBP No. 09-892-HLW-CAB04, at 2 (Dec. 22, 2009) (stating that "the parties are reminded that, pursuant to 10 C.F.R. § 2.107, withdrawal shall be on such terms as the Board may prescribe."). That section provides in relevant part that "[w]ithdrawal of an application after the

---

[1] *See* Presidential Memorandum -- Blue Ribbon Commission on America's Nuclear Future (Jan. 29, 2010) ("Presidential Memorandum"), *available at* http://www.whitehouse.gov/the-press-office/presidential-memorandum-blue-ribbon-commission-americas-nuclear-future; Department of Energy Press Release, Secretary Chu Announces Blue Ribbon Commission on America's Nuclear Future (January 29, 2010), *available at* http://www.energy.gov/news/8584.htm; Charter, Blue Ribbon Commission on America's Nuclear Future (filed March 1, 2010), *available at* http://www.energy.gov/news/documents/BRC_Charter.pdf. The Commission will conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle, including all alternatives for the storage, processing, and disposal of civilian and defense used nuclear fuel and materials derived from nuclear activities. *See id.*

[2] This decision was announced in the Administration's Fiscal Year 2011 Budget, which states that "[i]n 2010, the Department will discontinue its application to the Nuclear Regulatory Commission (NRC) for a license to construct a high-level waste geologic repository at Yucca Mountain, Nevada." Budget of the U.S. Government, Fiscal Year 2011: Terminations, Reductions, and Savings, at 62 (Feb. 1, 2010). The Department of Energy's Fiscal Year 2011 Congressional Budget Request similarly states that "in 2010, Department will discontinue its application to the U.S. Nuclear Regulatory Commission for a license to construct a high-level waste geologic repository at Yucca Mountain." Department of Energy, FY 2011 Congressional Budget Request, Vol. 7, at 163 (Feb. 2010).

issuance of a notice of hearing shall be on such terms as the presiding officer may prescribe." 10 C.F.R. § 2.107(a).

Thus, applicable Commission regulations empower this Board to regulate the terms and conditions of withdrawal. *Philadelphia Electric Company* (Fulton Generating Station, Units 1 and 2), ALAB-657, 14 N.R.C. 967, 974 (1981). Any terms imposed for withdrawal must bear a rational relationship to the conduct and legal harm at issue. *Id.* And the record must support any findings concerning the conduct and harm in question to impose a term. *Id.*, citing *LeCompte v. Mr. Chip, Inc.*, 528 F.2d 601, 604-05 (5th Cir. 1976); 5 Moore's Federal Practice ¶ 41.05[1] at 41–58.

A. The Board Should Grant Dismissal With Prejudice

In this instance, the Board should prescribe only one term of withdrawal—that the pending application for a permanent geologic repository at the Yucca Mountain site shall be dismissed with prejudice.[3]

That action will provide finality in ending the Yucca Mountain project for a permanent geologic repository and will enable the Blue Ribbon Commission, as established by the Department and funded by Congress, to focus on alternative methods of meeting the federal government's obligation to take high-level waste and spent nuclear fuel. It is the Secretary of Energy's judgment that scientific and engineering knowledge on issues relevant to disposition of high-level waste and spent nuclear fuel has advanced dramatically over the twenty years since the Yucca Mountain project was initiated. *See also* Presidential Memorandum at 1. Future proposals for the disposition of such materials should thus be based on a comprehensive and

[3] DOE seeks this form of dismissal because it does not intend ever to refile an application to construct a permanent geologic repository for spent nuclear fuel and high-level radioactive waste at Yucca Mountain.

careful evaluation of options supported by that knowledge, as well as other relevant factors, including the ability to secure broad public support, not on an approach that "has not proven effective" over several decades. *Id.*

The Board should defer to the Secretary's judgment that dismissal of the pending application with prejudice is appropriate here. Settled law in this area directs the NRC to defer to the judgment of policymakers within the Executive Branch.[4] And whether the public interest would be served by dismissing this application with prejudice is a matter within the purview of the Secretary.[5] From public statements already made, we of course understand that some will nevertheless argue that dismissing this application is contrary to the NWPA. Although it is impossible to anticipate exactly what parties will argue at this point, at least one litigant seeking to raise these issues in federal court has said the NWPA obligation to file the pending application is inconsistent with the decision to withdraw the application. This is simply wrong.

Nothing in the text of the NWPA strips the Secretary of an applicant's ordinary right to seek dismissal. In fact, the text of the statute cuts sharply in favor of the Secretary's right to seek

---

[4] *U.S. Department Of Energy* (Plutonium Export License), CLI-04-17, 59 N.R.C. 357, 374 (2004) (deferring, upon "balanc[ing] our statutory role in export licensing with the conduct of United States foreign relations, which is the responsibility of the Executive Branch," to Executive Branch determination on an export license application). *See also Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-03-30, 58 N.R.C. 454, 472 (2003) (expressing "considerable doubt" about the NRC's authority to "second-guess" the Bureau of Land Management on an issue relating to recommendations as to the wilderness status of land, and declining an invitation to do so); *see also Environmental Radiation Protection Standards for Nuclear Power Operations, 40 CFR 190*, CLI–81–4, 13 N.R.C. 298, 301 (1981) (deferring to EPA standards for radiation protection: "This agency does not sit as a reviewing court for a sister agency's regulations…."). *See generally Pacific Gas & Electric Company* (Stanislaus Nuclear Project, Unit 1), LBP-83-2 , 17 N.R.C. 45, 52 (1983) ("The law on withdrawal does not require a determination of whether [the applicant's] decision [to withdraw] is sound.").

[5] The Atomic Energy Act ("AEA" or "Act") gives the Secretary broad authority to carry out the Act's purposes, including the authority to direct the Government's "control of the possession, use, and production of atomic energy and special nuclear material, whether owned by the Government or others, so directed as to make the maximum contribution to the common defense and security and the national welfare." AEA § 3(c), 42 U.S.C. § 2013(c). Indeed, as the D.C. Circuit has recognized, the AEA established "a regulatory scheme which is virtually unique in the degree to which broad responsibility is reposed in the administering agency, free of close prescription in its charter as to how it shall proceed in achieving the statutory objectives." *Siegel v. AEC*, 400 F.2d 778, 783 (D.C. Cir. 1968). While *Siegel* concerned directly the branch of the then-Atomic Energy Commission that later became the NRC, its recognition that broad discretion is to be given to the governmental agencies charged with administering the AEA's objectives applies equally to the Department of Energy, the other lineal descendant of the AEC.

dismissal. The statute simply requires that the Secretary "shall submit . . . an application for a construction authorization." NWPA § 114(b), 42 U.S.C. § 10134(b). It neither directs nor circumscribes the Secretary's actions on the application after that submission.[6]

Indeed, far from imposing special limitations on DOE after the submission, the NWPA expressly requires that the application be considered "in accordance with the laws applicable to such applications." NWPA § 114(d), 42 U.S.C. § 10134(d). Those laws include 10 C.F.R. § 2.107, which, as this Board has recognized, authorizes withdrawals on terms the Board prescribes. Congress, when it enacted the NWPA in 1982, could have dictated that special rules applied to this proceeding to prevent withdrawal motions, or could have prescribed duties by DOE with respect to prosecution of the application after filing, but it chose not to do so.

Nor does the structure of the NWPA somehow override the plain textual indication in the statute that ordinary NRC rules govern here or dictate that the Secretary must continue with an application he has decided is contrary to the public interest. The NWPA does not prescribe a step-by-step process that leads inexorably to the opening of a repository at Yucca Mountain. Indeed, even if the NRC granted the pending application today, the Secretary would not have the authority to create an operational repository. That would require further action by DOE, other agencies, and Congress itself, yet none of those actions is either mandated or even mentioned by the NWPA. The NWPA does not require the Secretary to undertake the actions necessary to obtain the license to receive and possess materials that would be necessary to open a repository. 10 C.F.R. §§ 63.3, 63.32(d). Rather, the NWPA refers only to the need for a "construction

---

[6] After filing the application, the only NWPA mandate imposed on the Secretary is a *reporting* requirement to Congress to note the "project decision schedule that portrays the optimum way to attain the operation of the repository, within the time periods specified in this part." NWPA § 114(e)(1), 42 U.S.C. §10134(e)(1).

authorization," NWPA § 114(b), 42 U.S.C. § 10134(b) – and even there, as discussed, it mandates only the submission of an application. To open a facility, moreover, the Department would be required to obtain water rights, rights of way from the Bureau of Land Management for utilities and access roads, and Clean Water Act § 404 permits for repository construction, as well as all the state and federal approvals necessary for an approximately 300-mile rail line, among many other things. None of those actions is mandated by the NWPA. At least as important, as the prior Administration stressed, *Congress* would need to take further action not contained in the NWPA before any such repository could be opened.[7] In short, there are many acts between the filing of the application and the actual use of the repository that the NWPA does not require.

Where, even if the NRC granted the pending application, Congress has not authorized the Secretary to make the Yucca Mountain site operational, or even mandated that he take the many required steps to make it operational, it would be bizarre to read the statute to impose a non-discretionary duty to continue with any particular intermediate step (here, prosecuting the application), absent clear statutory language mandating that result. More generally, it has not been the NRC's practice to require any litigant to maintain a license application that the litigant does not wish to pursue. That deference to an applicant's decisions should apply more strongly where a government official has decided not to pursue a license application because he believes that other courses would better serve the public interest.

Finally, the fact that Congress has approved Yucca Mountain as the site of a repository, *see* Pub. L. No. 107-200, 116 Stat. 735 (2002) ("there hereby is approved the site at Yucca Mountain, Nevada, for a repository, with respect to which a notice of disapproval was submitted

---

7 *See* January 2009 Project Decision Schedule at 1 ("This schedule is predicated upon the enactment of legislation ... [regarding] land withdrawal."). *See also, e.g.*, Nuclear Fuel Management and Disposal Act, S.2589, 109th Congress, 2d Sess. § 3 (2006) (proposed legislation authorizing the withdrawal of lands necessary for the Yucca Mountain repository).

by the Governor of the State of Nevada on April 8, 2002"), means, in the D.C. Circuit's words, simply that the Secretary is "permitted" to seek authority to open such a site and that challenges to the prior process to select that site are moot. *Nuclear Energy Institute, Inc. v. EPA*, 373 F.3d 1251, 1309-10 (D.C. Cir. 2004). It does *not* require the Secretary to continue with an application proceeding if the Secretary decides that action is contrary to the public interest. *See, e.g.*, S. Rep. No. 107-159, at 13 (2002) ("It bears repeating that enactment of the joint resolution will not authorize construction of the repository or allow DOE to put any radioactive waste or spent nuclear fuel in it or even allow DOE to begin transporting waste to it. Enactment of the joint resolution will only allow DOE to take the next step in the process laid out by the Nuclear Waste Policy Act and apply to the NRC for authorization to construct the repository at Yucca Mountain."); H.R. Rep. No. 107-425, at 7 (2002) ("In accordance with the Nuclear Waste Policy Act (NWPA), such approval would allow the Department of Energy (DOE) to apply for a license with the Nuclear Regulatory Commission to construct a nuclear waste storage facility on the approved site.").[8] That conclusion is even more strongly compelled now, in light of Congress's recent decision to provide funding to a Blue Ribbon Commission, whose explicit purpose is to propose "alternatives" for the disposal of high-level waste and spent nuclear fuel.

Even if there were any ambiguity on these points, the Secretary's interpretation of the NWPA would be entitled to deference. *See Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984); *Gen. Elec. Uranium Mgmt. Corp. v. DOE*, 764 F.2d 896, 907 (D.C. Cir. 1985) (applying *Chevron* deference to uphold DOE's interpretation of the NWPA); *see also Skidmore v Swift Co.*, 323 U.S. 65 (1944); *Auer v. Robbins*, 519 U.S. 452 (1977); *Coeur*

[8] *See also* 148 Cong. Rec. 7155 (2002) (Rep. Dingell) (stating that Yucca Mountain Site Approval Act "is just about a step in a process"); *id.* at 7166 (Rep. Norwood) ("The vote today does not lock us in forever and we are not committed forever to Yucca Mountain."); *id.* at 12340 (Sen. Crapo) ("[T]his debate is not about whether to open the Yucca Mountain facility so much as it is about allowing the process of permitting to begin to take place.").

Alaska, Inc. v. Southeastern Alaska Conservation Council, 129 S. Ct. 2458 (2009). Simply put, the text of the NWPA does not specify actions the Secretary can or must take once the application is filed. Accordingly, while some may disagree with the wisdom of the Secretary's underlying policy decision, the Secretary may fill this statutory "gap." The Secretary's interpretation is a reasonable one that should be given great weight and sustained. *See, e.g., Tennessee v. Herrington*, 806 F.2d 642, 653 (6th Cir. 1986) ("[W]e are mindful of the Supreme Court's statement in *Chevron, supra*, that: 'When a challenge to an agency construction of a statutory provision, fairly conceptualized, really centers on the wisdom of the agency's policy, rather than whether it is a reasonable choice within a gap left open by Congress, the challenge must fail.'").

B. No Conditions Are Necessary As to the Licensing Support Network

Finally, there is no reason to impose conditions relating to the Licensing Support Network ("LSN") as a term of withdrawal. As DOE's prior filings with this Board explain, DOE will, at a minimum, maintain the LSN throughout this proceeding, including any appeals, and then archive the LSN materials in accordance with the Federal Records Act and other relevant law. *See* Department of Energy's Answers to the Board's Questions at the January 27, 2010 Case Management Conference (filed Feb. 4, 2010); Department of Energy's Status Report on Its Archiving Plan (filed Feb. 19, 2010). Thus, DOE will retain the full LSN functionality throughout this proceeding, including appeal, and then follow well established legal requirements that already govern DOE's obligations regarding these documents. DOE is also considering whether sound public and fiscal policy, and the goal of preserving the knowledge gained both inside and outside of this proceeding, suggest going even further than those legal

requirements. There is thus no need for this Board to impose additional conditions concerning the preservation of records.

* * *

DOE counsel has communicated with counsel for the other parties commencing on February 24, 2010, in an effort to resolve any issues raised by them prior to filing this Motion, per 10 C.F.R. § 2.323(b). The State of Nevada and the State of California have stated that they agree with the relief requested here. The Nuclear Regulatory Commission Staff has stated that it takes no position at this time. The Nuclear Energy Institute has stated that it does not consent to the relief requested and will file its position in a response. All other parties that have responded have stated that they reserve their positions until they see the final text of the motion.[9]

[9] These parties include: Clark County, Eureka County, Four Counties (Esmeralda, Lavender, Churchill, Mineral), Inyo County, Lincoln County, Native Community Action Council, Nye County, Timbisha Shoshone Tribal Group, White Pine County.

Respectfully submitted,

U.S. DEPARTMENT OF ENERGY
By Electronically Signed by Donald P. Irwin

Donald P. Irwin
Michael R. Shebelskie
HUNTON & WILLIAMS LLP
Riverfront Plaza, East Tower
951 East Byrd Street
Richmond, Virginia 23219-4074

Scott Blake Harris
Sean A. Lev
James Bennett McRae
U.S. DEPARTMENT OF ENERGY
Office of General Counsel
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Counsel for the U.S. Department of Energy

March 3, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Atomic Safety and Licensing Board

Before Administrative Judges:
Thomas S. Moore, Chairman
Paul S. Ryerson
Richard E. Wardwell

In the Matter of	)	Docket No. 63-001
U.S. DEPARTMENT OF ENERGY	)	ASLBP No. 09-892-HLW-CAB04
(High-Level Waste Repository)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the **U.S. DEPARTMENT OF ENERGY'S MOTION TO WITHDRAW** have been served on the following persons on this 3rd day of March 2010 through the Nuclear Regulatory Commission's Electronic Information Exchange.

CAB 04
Atomic Safety and Licensing Board Panel
Thomas S. Moore, Chair
E-mail: tsm2@nrc.gov
Paul S. Ryerson
E-mail: psr1@nrc.gov
Richard E. Wardwell
E-mail: rew@nrc.gov

Parties Served	**E-mail Addresses**
Adams, Marta	madams@ag.nv.gov
Andersen, Robert M.	robert.andersen@akerman.com
Bailey, Annie	baileys@lcturbonet.com
Barlow, Gregory	lcda@lcturbonet.com
Baughman, Mike	bigboff@aol.com
Bauser, Michael A.	mab@nei.org
Belete, Elene	ebelete@jsslaw.com
Bell, Kevin W.	kwbell@energy.state.ca.us

Berkey, Curtis	curtis.berkey@abwwlaw.com
Beutel, Theodore	tbeutel@eurekanv.org
Bollwerk III, G. Paul	gpb@nrc.gov
Borski, Laurie	lborski@nuclearlawyer.com
Brooks, Felicia M.	fbrooks@ndnlaw.com
Bupp, Margaret	mjb5@nrc.gov
Carter, Lorraine	lcarter@captionreporters.com
Cereghino, Stephen	stephen_cereghino@ymp.gov
Choate, Zoie	zchoate@co.nye.nv.us
Colburn, Ross	rcolburn@ndnlaw.com
Cottingham, Anne	awc@nei.org
Crosland, Martha S.	Martha.Crosland@hq.doe.gov
Curran, Diane	dcurran@harmoncurran.com
Damele, Ronald	rdamele@eurekanv.org
Dinunzio, Nicholas	Nicholas.Dinunzio@hq.doe.gov
Dobie, Julie	jdobie@gklaw.com
Dreher, Michael	michael.dreher@nrc.gov
Dudley, Sherry	sdudley@co.nye.nv.us
Durbin, Susan	susan.durbin@doj.ca.gov
Elk, Shane	sthinelk@ndnlaw.com
Eredia, Sally	seredia@ndnlaw.com
Fitzpatrick, Charles J.	cfitzpatrick@nuclearlawyer.com
Francis, Karin	kxf4@nrc.gov
Fraser, Matthew	mfraser@harmoncurran.com
Frishman, Steve	steve.frishman@gmail.com
Giitter, Rebecca	rll@nrc.gov
Gilman, Joseph	jsg1@nrc.gov
Ginsberg, Ellen C.	ecg@nei.org
Golshan, K. G.	kg.golshan@nrc.gov
Gores, Jennifer A.	jgores@armstrongteasdale.com
Graser, Daniel J.	djg2@nrc.gov
Gutierrez, Jocelyn	Jocelyn.Gutierrez@ymp.gov
Hanna, Robert S.	rshanna@bsglaw.net
Harrington, Arthur J.	aharring@gklaw.com
Harris, Scott Blake	Scott.Harris@hq.doe.gov
Hawkens, E. Roy	erh@nrc.gov
Hearing Docket	hearingdocket@nrc.gov
Heinzen, Steven A.	sheinzen@gklaw.com
Hembacher, Brian	brian.hembacher@doj.ca.gov
Horin, William	whorin@winston.com
Houck, Darcie L.	dhouck@ndnlaw.com
James, Gregory L. Esq.	gljames@earthlink.net
Johnson, Abigail	eurekanrc@gmail.com
Kahn, Zachary	zxk1@nrc.gov
Klevorick, Phil	klevorick@co.clark.nv.us
Larimore, Patricia	plarimore@talisman-intl.com

Lawrence, John W.	jlawrence@nuclearlawyer.com
Leigh, Rovianne	rleigh@abbwlaw.com
Lembke, Alisa	alembke@inyocounty.us
Lenehan, Daniel	daniel.lenehan@nrc.gov
Lev, Sean	sean.lev@hq.doe.gov
Lewis, Linda	linda.lewis@nrc.gov
List, Robert F.	rlist@armstrongteasdale.com
Loveland, Bryce	bloveland@jsslaw.com
Lynch, Susan	slynch1761@gmail.com
Maerten, Daniel	Daniel.Maerten@caci.com
Malsch, Martin G.	mmalsch@nuclearlawyer.com
Martin, Circe	ogcmailcenter@nrc.gov
Martinez, Melanie	wpnucwst2@mwpower.net
Mathias, Linda	yuccainfo@mineralcountynv.org
McRae, Ben	Ben.McRae@hq.doe.gov
Mercado, Michele	michele.mercado@doj.ca.gov
Miras-Wilson, Rachel	rwilson@winston.com
Montesi, Susan	smontesi@nuclearlawyer.com
Moore, Thomas S.	tsm2@nrc.gov
Mueller, Edwin	muellered@msn.com
Murphy, Malachy	mrmurphy@chamberscable.com
Nezhad, Cyrus	Cyrus.Nezhad@hq.doe.gov
Niegemann, Brian	bniegemann@ndnlaw.com
OCAA Mail Center	OCAAMAIL@nrc.gov
Pak, Christina	Christina.Pak@hq.doe.gov
Peebles, John M.	jpeebles@ndnlaw.com
Peterson, William	paengineer@juno.com
Pitchford, Loreen, LSN Coordinator	lpitchford@comcast.net
Pitts, Jason	jayson@idtservices.com
Poland, Douglas M.	dpoland@gklaw.com
Putzu, Frank	frank.putzu@navy.mil
Renfro, Hanna	hrenfro@gklaw.com
Repka, David A.	drepka@winston.com
Rhoan, Robert	rrhoan@ndnlaw.com
Robbins, Alan	arobbins@jsslaw.com
Roby, Debra	droby@jsslaw.com
Rosenthal, Alan S.	rsnthl@nrc.gov; axr@nrc.gov
Rotman, Matthew	matthew.rotman@nrc.gov
Ryan, Tom	Tom.Ryan@nrc.gov
Ryerson, Paul S.	psr1@nrc.gov
Schwartz, Jacqueline	jschwartz@gklaw.com
Sears, Richard	rwsears@wpcda.org
Silberg, Jay E.	jay.silberg@pillsburylaw.com
Silvia, Andrea L.	alc1@nrc.gov
Simkins, Connie	jcciac@co.lincoln.nv.us
Simon, Mike	wpnucast1@mwpower.net

Sisco, Carlos L.	csisco@winston.com
Sommer, Josephine	Josephine.Sommer@ymp.gov
Sullivan, Timothy E.	timothy.sullivan@doj.ca.gov
Tucker, Katherine	Katie.Tucker@nrc.gov
VanNiel, Jeffrey D.	nbrjdvn@gmail.com
Vazquez, Tameka	purpose_driven@yahoo.com
Vibert, Elizabeth A.	VibertE@co.clark.nv.us
Walsh, Timothy J.	timothy.walsh@pillsburylaw.com
Wardwell, Richard E.	rew@nrc.gov
Webb, Maria	maria.webb@pillsburylaw.com
Whipple, Bret	bretwhipple@lcturbonet.com
Williams, Scott	swilliams@abbwlaw.com
Young, Mitzi A.	may@nrc.gov
Zabarte, Ian	mrizabarte@gmail.com
Zobler, Marian L.	mlz@nrc.gov

U.S. DEPARTMENT OF ENERGY

By Electronically Signed by Stephanie E. Meharg

Donald J. Silverman
Thomas A. Schmutz
Alex S. Polonsky
Raphael P. Kuyler
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, DC 20004

Donald P. Irwin
Michael R. Shebelskie
HUNTON & WILLIAMS LLP
Riverfront Plaza, East Tower
951 East Byrd Street
Richmond, Virginia 23219-4074

James Bennett McRae
U.S. DEPARTMENT OF ENERGY
Office of General Counsel
Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Counsel for the U.S. Department of Energy

TAB 8

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

NEWS

Media Contact: Maureen Brown, (626) 302-2255

SCE Selects Robust Underground System to Store San Onofre Used Nuclear Fuel

ROSEMEAD, Calif., Dec. 11, 2014 — Southern California Edison (SCE) has selected Holtec International to expand the San Onofre nuclear plant's storage of used nuclear fuel in a robust underground facility.

The contract with Holtec represents a major step in the decommissioning of the nuclear plant. It sets the stage to transfer San Onofre's used fuel from steel-lined concrete storage pools to steel-and-concrete-encased canisters, with a goal of completing the work by mid-2019.

"After reviewing leading designs with the San Onofre Community Engagement Panel, we concluded this underground design is best suited to safely and securely store used nuclear fuel at San Onofre until the federal government removes the fuel from site, as required," said Chris Thompson, SCE vice president of Decommissioning. "Our decision to move expeditiously to transfer the fuel also reflects feedback from community leaders who prefer dry storage of used nuclear fuel."

Thompson noted the robust Holtec design exceeds California earthquake requirements and protects against hazards such as water, fire or tsunamis.

"I especially want to thank the Community Engagement Panel for its thoughtful questions and enormous time commitment during SCE's evaluation," said Thompson, noting that SCE ultimately focused on cask designs licensed by the Nuclear Regulatory Commission for both storage *and* transport of used nuclear fuel.

While dry storage of nuclear fuel is a proven technology used for almost three decades in the United States, Thompson said SCE will go beyond industry practices by partnering with the Electric Power Research Institute to develop new inspection techniques to monitor cask integrity.

Holtec's HI-STORM UMAX underground storage system features corrosion-resistant, stainless-steel fuel canisters topped with a 24,000-pound steel and concrete lid. The canisters will be encased in a concrete monolith. Holtec is a global supplier and has nuclear fuel storage systems at two other California locations, Humboldt Bay and Diablo Canyon. More information is available in this fact sheet.

Thompson said engineering work begins immediately, followed by fabrication of canisters. Completion of the dry storage project facilitates major dismantlement work SCE plans to complete within 20 years.

SCE announced in June 2013 that it would retire San Onofre Units 2 and 3, and begin preparations to decommission the facility. SCE has established core principles of safety, stewardship and engagement to guide decommissioning. For more information about SCE, visit www.songscommunity.com.

About Southern California Edison
An Edison International (NYSE:EIX) company, Southern California Edison is one of the nation's largest electric utilities, serving a population of nearly 14 million via 4.9 million customer accounts in a 50,000-square-mile service area within Central, Coastal and Southern California.

###

TAB 9

San Onofre Nuclear Waste Problems

Tom English, Ph.D., Samuel Lawrence Foundation
Subrata Chakraborty, Ph.D., UCSD, Dept. of Chemistry and Biochemistry
Rear Admiral Len Hering Sr. USN (ret)

January 2019

INTRODUCTION

In August 2018, a near-accident during the loading of nuclear waste into dry storage triggered a federal investigation and brought new urgency to the debate of how best to store some of the most dangerous waste known to humankind – spent nuclear fuel. The San Onofre Nuclear Generating Station (S.O.N.G.S.) closed in 2012 after a number of serious failures. Since then, Southern California Edison and its contractor, Holtec International, built a concrete storage vault to hold 3.6 million pounds of nuclear waste in dry storage. That vault is footsteps from the rising Pacific Ocean. In our brief report, we explore the fatal flaws of this location and recommend moving the storage facility to a technically defensible storage facility at a significantly higher elevation with distance from the ocean. We address the inadequacy of the equipment used to move and contain the nuclear waste material. We explore the gouging that occurs when stainless steel canisters are lowered into the storage vault and how gouging compromises the integrity of the containers. Finally, we examine management practices at San Onofre and an apparent lack of supervision, training and protocols. The examination of the perils of S.O.N.G.S. Independent Spent Fuel Storage Installations' poor location, poor technology and poor management, presents an urgent situation for regulators to: order Edison to permanently stop the loading of canisters into dry storage, require Edison to store the waste in canisters that may be inspected, and secure an independent analysis and risk assessment of canister loading procedure.

RATIONALE

Most serious of the issues facing the interim storage of nuclear waste at S.O.N.G.S. include the gouging damage to fully-loaded steel canisters upon downloading into the storage vault. These 54-ton thin-walled steel canisters are loaded with nuclear waste in wet storage – spent fuel pools – and are transported to the on-site concrete storage vault, adjacent to the reactor domes. With the Brinell hardness scale calculations our team demonstrates the depth and width of canister gouges upon downloading into the storage system. The current downloading procedure and on-site storage configuration provides the factors necessary to create gouges in the external steel walls of the canisters: operators have no visibility of the canister during downloading and precise adjustments to canister orientation cannot be made. These gouges remain undetected and unrepaired due to the lack of thorough inspection and monitoring at

the San Onofre Independent Spent Fuel Storage Installations (ISFSIs). The preliminary findings are found in this report.

1. POOR LOCATION

Today, two separate Independent Spent Fuel Storage Installations (ISFSIs) exist at San Onofre. The newest, built by Holtec, is located about 100 feet from the Pacific Ocean on the 85-acre grounds of S.O.N.G.S. The property is part of Marine Corps Base Camp Pendleton and is owned by the Department of the Navy. Two of the nation's busiest transportation corridors -- Interstate 5 and the Los Angeles-San Diego-San Luis Obispo Rail Line -- flank the site. The ISFSIs are clearly visible in Google Earth images and in numerous published photographs. The high accessibility and visibility of the site leaves it extremely vulnerable to an act of malfeasance.

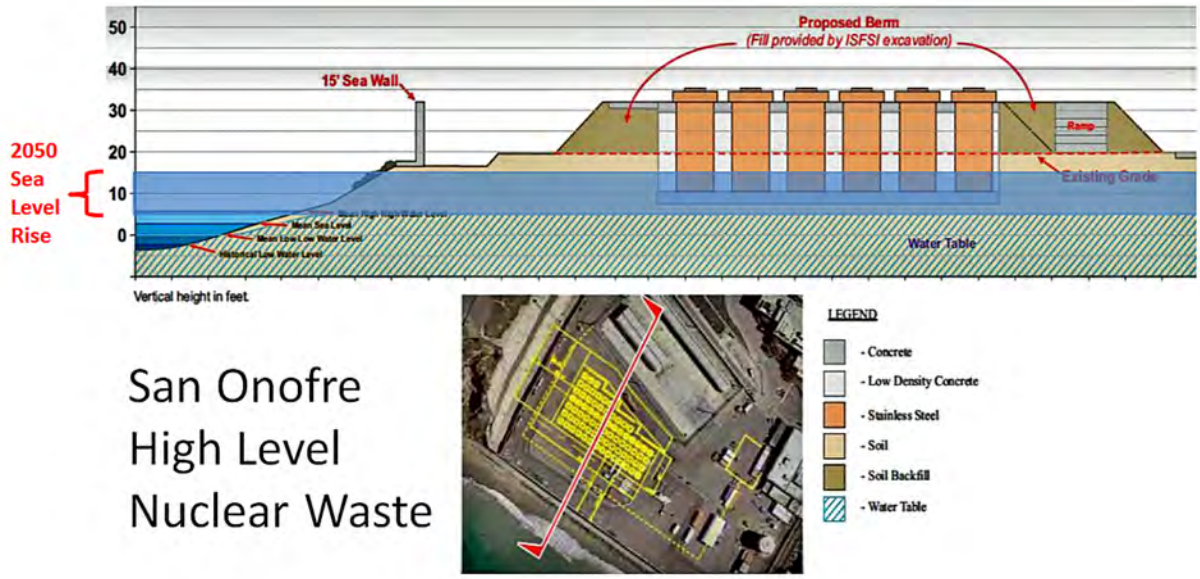


Figure 1. Independent Spent Fuel Storage Installations and Storage Vault.

Forces of nature, exacerbated by sea-level rise, carry further risks. Frequent high humidity and coastal fog make the metal at the site susceptible to short-term corrosion and stress-induced corrosion cracking. Also located at this site is a second, older ISFSI, which contains 51 thin-walled steel canisters that are up to 15 years old.

Numerous reports show that mean high tide level is about 18 inches below the base of the newer, oceanfront ISFSI, which was designed by Holtec. Since this is the mean height, the sea level frequently exceeds this height. Hence, it is likely the present ground water table will leach into the storage vault and result in at least damp storage. Further sea level rise due to climate change will make this problem far worse.

Dr. James Hansen, who managed NASA's climate change program for about 25 years, predicts sea levels could rise up to 10 feet during the next 50 years. At San Onofre, this would cause the bottom seven feet of the Holtec nuclear storage canisters to be submerged in seawater, unintentionally resulting in wet storage. This would invite a crisis similar to that of Fukushima, where spent fuel was exposed to moisture.

A second estimate appears in a comprehensive report by the Working Group of the California Ocean Protection Council Science Advisory Team. Published in 2017, the report shows 75% likelihood sea levels will rise by two feet by 2100. Either of these scenarios envisions that a major portion of the nuclear storage canisters as San Onofre would be submerged in seawater. The combination of the effects of sea-level rise and ground water inundation at the current location would change the Holtec ISFSI to wet storage site, for which it was not designed. Hence, little if anything would be accomplished by moving the waste from the spent-fuel pool to the dry storage ISFSI. The dangers would not be decreased. If anything, the inability to adequately measure and mitigate the impacts of corrosion on the underground nuclear canisters would lead to a significant increase in risk.

All of this can be avoided. If the nuclear waste at the two ISFSIs is transferred into thick-walled casks and then moved to a technically defensible storage facility at higher ground, the problems of ocean water and ground water intrusion can be avoided. As an added benefit, the waste would be easier to secure from an act of malfeasance.

2. POOR TECHNOLOGY

In California, the storage tanks at gas stations must be double-walled; painful experience has shown that single-walled containers can leak gasoline into the groundwater system. With a double-walled fuel tank, if a leak occurs it can be detected and the storage container can be repaired or replaced before any gasoline is released. At San Onofre, we certainly should expect that some kind of leak prevention system would be in place to contain extremely toxic high-level radioactive waste. Additionally, the canisters should be able to be monitored and inspected. The thin-walled canisters at the San Onofre ISFSIs cannot be adequately monitored or inspected. Regulators and Holtec officials have stated that the canisters cannot be inspected from the inside or the outside for cracks or other degradation and that, even if damage could be identified, it would be impossible to fix.

To illustrate the importance of adequate monitoring, we analyze a scenario in which one vent of a canister clogs. We refer to a Holtec non-proprietary safety analysis report[1] that calculates a temperature rise to about 90% of the maximum permissible limit (MPL) in 24 hours. This infers that within the next 12 hours the system will exceed the MPL rating and lead to a meltdown[2].

[1] Table 4.I.9, page 1050, Holtec International Final Safety Analysis Report for the HI-STORM 100 Cask System. USNRC Docket No.: 72-1014, Holtec Report No.: HI-2002444.
[2] S. Alyokhina, Thermal analysis of certain accident conditions of dry spent nuclear fuel storage, Nuclear Engineering and Technology 50 (2018) 717-723.

Through our own statistical analysis,[3] we prove that if the probability of clogging one of the vents during an event is 1%, then the chance that one of the 146 total vents (two vents on each of 73 canisters) will clog in such an event is 78%. This chance reduces to 53% if we reduce the probability of occurrence to .5% from 1%. Tsunamis followed by clogging are dependent events and thus the combined chance of such an event is about 11% during a 30-year period. The sea level rise, the rise of tide levels and the associated rise in the coastal aquifer are all interlinked, as discussed previously. These climate-related phenomena could cause serious damage to the ISFSIs. Therefore, close monitoring and the use of proven thick-walled cask technology for all nuclear waste storage containers is not only necessary but urgent. A mishap could imperil the lives and livelihoods of more than 8 million people who live within 50 miles of the ISFSIs.

2.1 NEAR MISS EVENT

David Fritch, an industrial safety inspector turned whistleblower, remembers August 3, 2018, as a bad day. Fritch worked at San Onofre during a loading failure that left a fully-loaded 54-ton canister of high-level radioactive waste stuck on the lip of a guide ring. Above the 17-foot-tall canister, the slings that attached it to the behemoth loading rig had gone slack.

The canister was, “hanging by about a quarter inch,” Fritch told attendees of the community engagement panel on August 9. “It’s a bad day. That happened, and you haven’t heard about it, and that’s not right. What we have is a canister that could have fallen 18 feet.”

Subsequent investigations revealed that the operators and managers could not see Canister No. 29 as it was being loaded into the storage cavity and became stuck for nearly an hour.

Since the near-accident, regulators have halted further loading of canisters into the seaside storage vault and researchers have explored what could have happened if Canister No. 29 had fallen.

Our own research explores the basic physics of a fully-loaded 54-ton canister in free fall to extrapolate the upper energy involved in the initial impact.

For example, the falling canister could hit the steel-lined concrete floor of the nuclear waste storage facility with explosive energy greater than that of several large sticks of dynamite. The resultant damage to the canister could cause a large radiation release.
At point of contact at the bottom of the storage cavity, damage to the concrete and metal structure could ruin the cooling system. The damage to the concrete would equal that of a fully-loaded 18-wheeler truck, with a gross weight of 80,000 pounds, crashing into reinforced concrete at 23 miles per hour. Our preliminary calculations show the combination of the weight and velocity of the dropped canister exceeds the ISFSIs’ “design criteria for tornado missiles,” by a factor of 4. Future experiments should include drop tests of the actual canisters with non-

[3] Chakraborty and English, 2019, ES&H Risk Estimation from “Interim Storage” of SNF at the Beach: The San Onofre NPP, WM2019 Conference, March 3-7, 2019, Phoenix, Arizona, USA (under review).

radioactive loads that simulate the weight of the spent fuel assemblies and fuel baskets to determine what would happen to the actual canisters.

Southern California Edison is set to move 73 canisters into the seaside storage vault and, at the time of publication, has moved 29. Each nuclear storage canister contains 37 spent fuel assemblies, which generate enormous amounts of heat. The systems are cooled by a simple air duct system, which could have been blocked by the damage caused by the canister's fall. If that had happened, great quantities of water would have been needed to cool the reaction and prevent or control a meltdown. The enveloping water would instantly become radioactive steam, as we saw at Fukushima. In the heavily-populated area surrounding San Onofre, however, radioactive steam could prompt the evacuation of millions of people. What's more, since both the canister and the surrounding structure could be badly damaged, there would be no available way to pull the damaged canister from the storage cavity.

Nuclear Regulatory Commission (NRC) computer simulations show what happens when a nuclear storage canister with slightly thinner walls[4] drops from 19 feet. In the test, a canister falls from a transfer cask onto a storage pedestal. The canister failure rate was 28%. Similar calculations must be performed at San Onofre to determine if that storage system has a similar probability of canister failure. At 28%, that is more than a one-in-four chance of catastrophic failure. Would you fly on an airplane with those odds? Our analysis alone should place the NRC, policymakers and Edison on alert. A more substantial analysis must be completed to examine the potential damage that can be caused by a falling, fully-loaded 54-ton nuclear storage canister.

Continued loading of the nuclear waste into canisters threatens the lives and livelihood of more than 8 million people. Software and computer resources are available by which estimates can be made of the impacts of a dropped canister on both the reinforced concrete and the canister walls. The NRC-approved Holtec technical specifications state that a canister drop of more than 11 inches requires the contents of the canister to be inspected for damage. This specification assumed the canister was in a transfer cask. The impact of an un-casked canister was never analyzed because Holtec and the NRC assumed it could never happen, citing triple-redundancy of the fuel transfer system. But a subsequent NRC inspection revealed that on August 3rd, all three components of this system simultaneously failed. Only the accidental snag of a quarter-inch of the 54-ton canister on the lip of the guide ring prevented a catastrophe.

Our research suggests the entire storage system may need to be redesigned to reduce the probability of canister failure to levels that are acceptable in such a highly-populated area.

[4] Pg. 4-24 Table 12, NUREG-1864 - A Pilot Probabilistic Risk Assessment of a Dry Cask Storage System at a Nuclear Power Plant, March 2007, A. Malliakos, NRC Project Manager

RESULTS

2.2 GOUGES IN DROPPED CANISTER

In their 2007 report, the NRC's analysts did not consider the impact of gouges on the strength of canister walls. There was no need, the analysts and a Holtec official said, as gouges were not important to the system under examination. We disagree. A detailed analysis of gouging is necessary to properly evaluate the damage to Canister No. 29 during the botched loading and to every other canister loaded into the ISFSI.

We established preliminary results of such an analysis using the Brinell hardness scale approach to estimate the depth and width of expected gouges in 316 stainless steel, of which the Holtec canisters at San Onofre is made.

While the canister is stuck, the guide ring gouges the bottom of the canister.

As the canister drops it is gouged on two sides by a combination of the guide ring, the storage cavity wall and the inner diameter of the transfer cask. This gouging absorbs some of the kinetic energy of the canister.

When the canister smashes into the bottom of the cavity, the kinetic energy and momentum from the fall will be dissipated by damage to:

- the ISFSI;
- the canister; and
- the contents of the canister.

The formation process of gouges will exert a force on the canister. This is the force, P, shown in Figure 2.

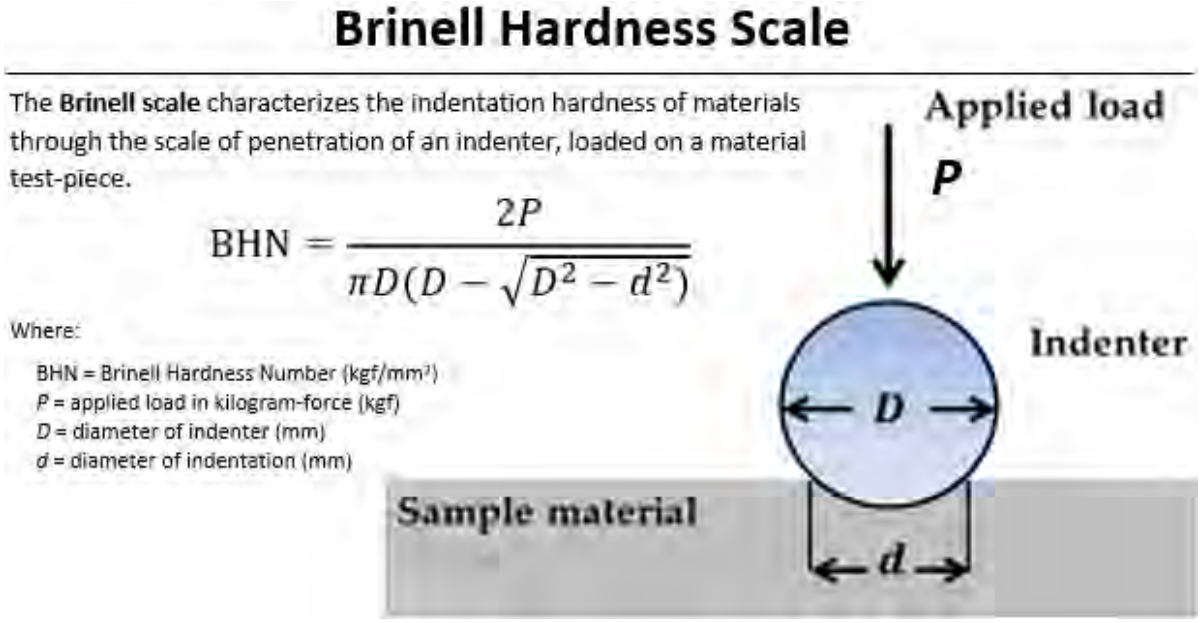


Figure 2. Brinell hardness scale calculation. Credit: *The Samuel Lawrence Foundation*.

In Figure 3, the width of a gouge is shown in relationship to the canister's weight. The expected range of gouge widths is shown in Figure 3. A variety of indenter widths are used as a surrogate for the gouging. The gouging widths range from 2 mm to 16 mm. This is highly significant, since the thickness of the nuclear canisters is 5/8", which is close to 16 mm. We recommend that tests be performed on actual canisters to experimentally determine the accuracy of these predictions.

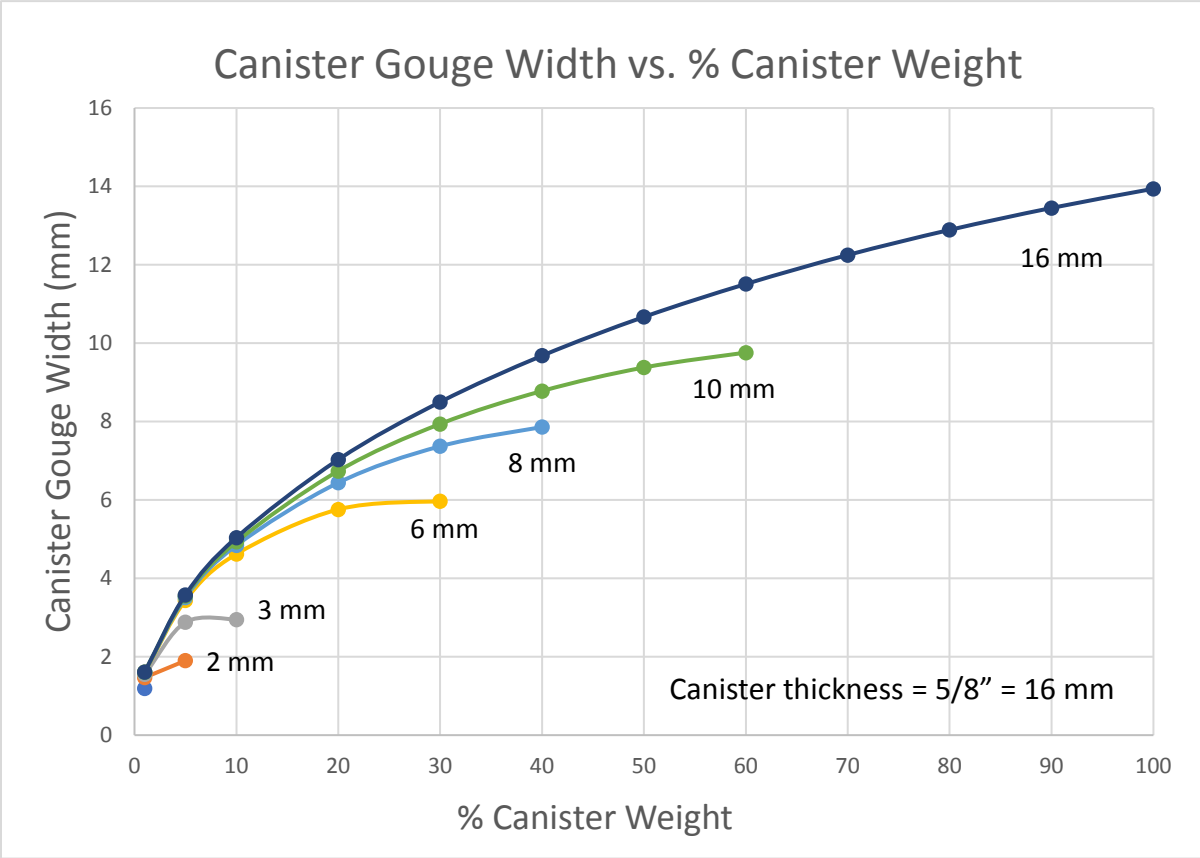


Figure 3. Calculated penetration width of gouge as a function of load for different intender diameter. The hardness number in Brinell scale for stainless steel 316 (BHN) is 217 kgf/mm^2. Saturated zone is eliminated.

The expected range of gouge depths is shown in Figure 4. A variety of indenter depths are used as a surrogate for the gouging. The gouging depths expected to be found range from 1 mm to 4.5 mm. This is highly significant, since 4.5 mm is 28% of the thickness of the nuclear storage canister.

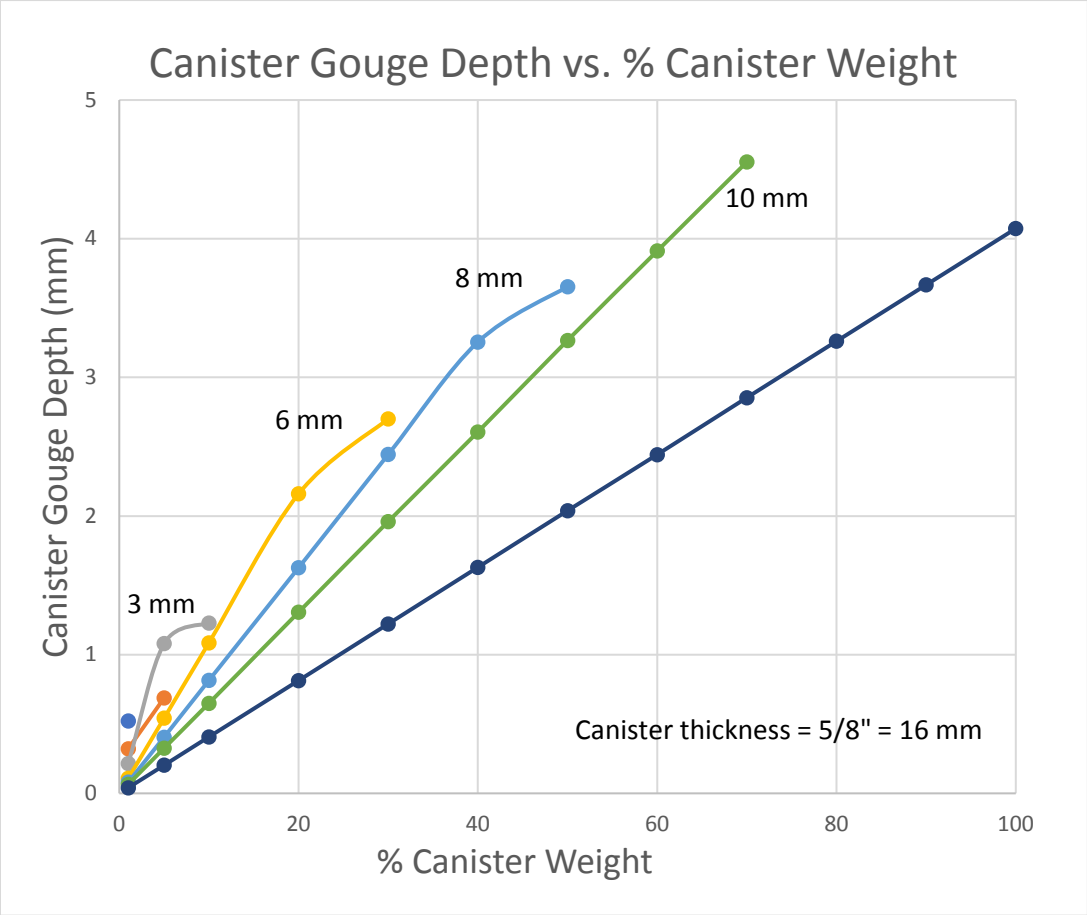


Figure 4. Calculated penetration depth of gouge as a function of load for different intender diameter. The hardness number in Brinell scale for stainless steel 316 (BHN) is 217 kgf/mm^2.

2.3 GOUGES DURING ROUTINE LOADING

Extensive gouging will also occur during routine loading of the nuclear storage canister into the storage cavity. By moving the Vertical Cask Transporter, shown in Figure 5, crude adjustments can be made to the alignment of the canister as it is lowered into the storage cavity. The bulky, tank-like machine travels on steel treads, like those found on earth-moving or military equipment. The transporter is not equipped to make the fine adjustments required to insert the nuclear storage canister into the narrow spacing of the storage cavity without banging the canister against the guide ring. This banging gouges the canister and causes the canister to move side-to-side, similar to a pendulum. An Edison official has referred to this process as "jiggling." This jiggling process continues for 15 to 30 minutes as the canister is lowered to the bottom of the storage cavity. Each "jiggle" causes the type of gouging shown in Figure 3 and

Figure 4. We expect that this routine loading process produces a multitude of gouges that significantly damage the canister walls, rendering them unsuitable for storage of nuclear waste.

Figure 5. Vertical Cask Transporter during downloading and alignment of a canister. Credit: *San Onofre Special Inspection Webinar Presentation (NRC)*.

We strongly recommend that a sampling of the canisters previously lowered into the storage vault be removed and inspected so the extent of gouging can be experimentally determined. We expect the damage will be so severe that the current ISFSI will need to be replaced.

3. POOR MANAGEMENT

During the late 1970s and early 1980s, Rear Admiral Len Hering, USN (ret) served as a Nuclear Weapons Safety Officer, Handling Officer and Surety Officer. Admiral Hering provides the following assessment of management practices at the S.O.N.G.S. ISFSI.

When it comes to the handling and movement of nuclear material, you would expect that only those specifically qualified and trained for such an important task would be deployed to ensure the safe movement of that material. In the Department of Defense (DOD), strict requirements are in place to make sure this very dangerous material is properly handled, transported and stowed.

The DOD and Navy programs were created and built to make certain nuclear material was secure, safely handled and accounted for. Every person who has any contact with nuclear material is required to have a security clearance. A “two-person rule” is in effect at all times. Personnel at all levels perform countless hours of training, obtain certifications of qualification, and complete rigorous inspection and training events to both prove and assure their proficiency in performing the job they are assigned. All of this is all done before anyone is permitted to even gaze upon a real weapon.

Handling gear and all aspects of the evolution are vigilantly maintained, inspected, weight-tested and inspected again. Cranes and dollies or hoist equipment are tested, placed under extreme loading conditions and prepared for specific tasks. Nothing goes untested. Nothing. We leave nothing to chance and we never hypothetically presume. If it isn’t tested and proven, it isn’t done with the actual material in question.

Ashore, and specifically at S.O.N.G.S, I find that virtually none of the protocols that should be expected for the safe handling of this dangerous material are present. I find that personnel and companies are being hired virtually off the street, no specific qualification standards are present or for that matter even required, training is not specific to the risks of the material involved, and there is no fully-qualified and certified team assembled for this highly-critical operation. They have not been required to conduct dry runs to ensure handling teams are proficient and, more importantly, they have never trained specifically to be ready to execute emergency procedures should the unexpected occur. The manuals are not on site, nor are they being followed to step a team through the evolution of moving the nuclear waste. Team leaders have no specific handling qualifications or training. Even the industrial safety inspectors are not specifically nuclear-certified but are general industrial specialists. No manuals are available for procedural review and, by their own admission, the required number of safety officials are often absent during movement of the nuclear storage canisters. In the Navy, if a near-accident such as the one at S.O.N.G.S is uncovered, the Commanding Officer, Weapons Officer -- and anyone else with a significant position on the team -- are relieved. The ship is then ordered to stand-down while a team of experts off-loads its cargo.

The widely reported incident in which a 54-ton, thin-walled container nearly fell 18 feet while it was being lowered into its silo rocked me to the core. What made things worse was narrative in a follow-up report that stated the canister was left suspended for nearly an hour, held up by a mere guide ring installed in the silo, cables slack and operators clueless. There is no doubt that this incident occurred because those on-scene were completely unqualified, unprepared, untrained and incompetent. This very dangerous operation was being performed as if this crew were moving a simple stack of wood around a construction site when, in actuality, the crew was conducting one of the most dangerous operations in the industrial sector. No one was relieved, fired or held accountable. The investigation being conducted is flawed in that those responsible for this deplorable safety environment are the same people who will feed findings to the investigation.

The handling of nuclear waste at San Onofre and other sites across our country should scare every single American. We have a regulatory agency that has failed to make sure the most basic safety precautions are being applied to one of the most dangerous industrial evolutions of our time. The number of waivers being issued where safety is of concern is staggering.

In the DOD, the reason why there were and continue to be no significant accidents with the handling of nuclear material is because there are no waivers and there are no quick wins. Workers are fully qualified, inspected and certified to handle this very dangerous material. In this case, there is no room for error. One mistake is too many. It is my professional opinion that we need to hit the reset button before a disaster of unparalleled portion occurs.

CONCLUSION

The nuclear waste at San Onofre requires a much better storage configuration and must be moved to a technically defensible storage facility to reduce threats. From a security standpoint, the waste should be moved further away from major transportation corridors. The thin-walled nuclear waste storage canisters are at risk of failure due to gouging when downloaded into the seaside storage vault. Once lowered into the storage system, the canisters cannot be thoroughly inspected, monitored or repaired. A near-accident on August 3rd demonstrated that safety protocols are lacking, and that further study is needed to understand the consequences of dropping a fully-loaded 54-ton canister of nuclear waste. The incident revealed that the loading equipment is imprecise and revealed a pattern of mismanagement in canister loading procedure. A complete analysis of canister loading procedure and comprehensive risk assessment must be conducted by an independent party with absolute transparency. If an accident, natural disaster, negligence, or an act of terrorism were to cause a large-scale release of radiation, the health and safety of 8.4 million people within a 50-mile radius would be put at risk. To secure the nuclear waste properly, we recommend a permanent stop to the loading of nuclear storage canisters into the seaside storage vault, placing spent fuel into reliable canisters that can be monitored, inspected and repaired, and moving these canisters to an acceptable storage facility at a significantly higher elevation.

ACKNOWLEDGEMENTS

We thank UCSD Departments of Chemistry and Biochemistry and The Samuel Lawrence Foundation. For more information visit www.samuellawrencefoundation.org/nuclear-energy.

TAB 10

ARTICLE XII.
CONTRACTOR'S WARRANTIES

12.1 WARRANTIES.

(a) Contractor warrants to Company that all Equipment shall be (i) new and of good quality; (ii) free from improper workmanship and Defects; (iii) conform to all applicable requirements of all Applicable Laws and all Applicable Permits; and (iv) be fit for Company's use in the nuclear power industry for the intended purpose. If Contractor accepts the Existing Canisters for use, Contractor warrants that the Existing Canisters shall be free from Defects or improper workmanship to the extent caused by or due to Contractor's acts or omissions.

(b) Contractor warrants to Company that the Work will be performed in a good and workmanlike manner, and that the Work will: (i) conform to and be designed, engineered and constructed in accordance with the Drawings, Scope of Work, all Applicable Laws and Applicable Permits and other terms of the Contract Documents; (ii) conform with, and be designed and engineered according to professional standards and skill, expertise and diligence of design professionals regularly involved in decommissioning projects similar to the Project, and comply with the requirements of the relevant Government Authorities, including the NRC; (iii) be suitable for the use as set forth in the Technical Specification; (iv) be compatible with the spent fuel pools for Units 2 and 3, spent fuel, fuel handling building, the existing ISFSI, Jobsite, and the SONGS site conditions; (v) contain the Equipment, supplies and materials described in the Scope of Work, all installed in accord with the applicable Contract Documents; (vi) in the case of Apparatus be designed, engineered, licensed, fabricated and manufactured using appropriate and approved processes, procedures and materials and to comply with and satisfy all the terms of the Certificate of Compliance issued by the NRC to Contractor as modified or amended as contemplated herein; (vii) in the case of Drawings or documents required hereunder, accurately and completely present information required to be included therein or necessary to avoid misunderstandings of the included content; and (viii) at such times as the NRC issues or amends a Certificate of Compliance with respect to an Apparatus or Existing Canisters, as applicable, the Apparatus or such Existing Canister specifically approved by the NRC to perform functions required by regulation as described in such Certificate of Compliance shall perform its required functions set forth in such Certificate.

(c) Contractor warrants to Company that all of the documents prepared by Contractor for submittal to a Government Authority for review and approval shall be prepared in full compliance with Applicable Laws and in form and substance such that Company shall not be

required to modify or revise such documents due to a failure to include any required information, inaccuracies or the use of inappropriate forms or formats.

(d) Contractor warrants to Company that none of the Work, including the Equipment (but not including the Existing Canisters), the Drawings, Final Plans and the design, engineering and other services rendered by Contractor hereunder, nor the use or ownership thereof by Company in accordance with the licenses granted hereunder, infringes, violates or constitutes a misappropriation of any trade secrets, proprietary rights, intellectual property rights, patents, copyrights or trademarks.

(e) Except as expressly stated herein to the contrary, Contractor warrants that it shall remedy, in accordance with Section 12.2, any Defects in the Work due to faulty design, materials or workmanship which appear within a period commencing upon the date of ISFSI Scope Completion and continuing for the applicable period following the ISFSI Scope Completion Date (as such period may be extended in accordance with the terms hereof, the "Warranty Period"), as follows:

(i) with respect to the MPC-37 canisters, twenty five (25) years;

(ii) with respect to Contractor's Work on Existing Canisters used to store non-fuel waste from the spent fuel pools, twenty five (25) years; provided that the Warranty Period with respect to such Work shall commence on the date that the last of the Existing Canisters containing non-fuel waste are loaded on the ISFSI during Post-ISFSI Scope Work and the related Milestone has been completed;

(iii) with respect to the Contractor's Work on Existing Canisters used to store greater than class "C" radioactive waste from reactor vessel segmentation in the Post-ISFSI Scope Work, twenty five (25) years; provided that the Warranty Period with respect to such Work shall commence on the Final Acceptance Date;

(iv) with respect to the HI-STORM UMAX System, ten (10) years;

(v) with respect to any other Work that is required to be completed in order to achieve ISFSI Scope Completion, including Contractor's Work on any newly assembled AHSM-HS modules that are used by Contractor in the performance of the Work, two (2) years; and

(vi) with respect to any other Work that is completed after the ISFSI Scope Completion Date, two (2) years from the Final Acceptance Date.

Contractor shall bear all costs of corrections and repairs during the Warranty Period. The provisions of this Section 12.1 apply to Work performed by Subcontractors as well as Work performed directly by Contractor. The provisions of this Article XII do not apply to corrective work caused by the acts or omissions of Company or any separate contractor of Company. If and in the event Company notifies Contractor of a Defect within the Warranty Period, Contractor, at Contractor's expense, shall perform all Work necessary to remedy the Defect, and the repair or replacement Work performed by Contractor to accomplish that purpose shall be subject to an additional express warranty from the date the repair or replacement is completed which shall continue for a duration equivalent to the original Warranty Period.

(f) Notwithstanding anything to the contrary herein, the warranties set forth in this Section 12.1 shall not apply with respect to any claims to the extent arising from (i) any use of the Work or components thereof by Company that exceeds the requirements or recommendations in Contractor's operation and maintenance manuals; (ii) the failure of any Equipment or Work to be maintained in accordance with Contractor's written instructions; or (iii) the modification of any Equipment or Work without Contractor's written consent.

(g) THE WARRANTIES OF CONTRACTOR SET FORTH IN THIS AGREEMENT ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER STATUTORY, EXPRESS OR IMPLIED (INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM COURSE OF DEALING AND USAGE OF TRADE). The foregoing sentence is not intended to disclaim any other obligations of Contractor set forth herein.

12.2 REPAIR OF NONCONFORMING WORK.

(a) If any of the Work is found to contain Defects, or Contractor is otherwise in breach of any of the warranties set forth in Section 12.1 within the Warranty Period, Contractor shall at its sole cost and expense and without reimbursement hereunder correct, reperform, repair or replace such Defect or otherwise cure such breach as promptly as practicable upon being given notice thereof. Subject to Section 12.3, Company shall give notice to Contractor within two (2) Business Days of discovery of such Defect. Company shall provide Contractor with reasonable access to the Project in order to perform such corrective Work and the Parties shall schedule such corrections or replacements as necessary so as to minimize disruptions to any on-going activities at SONGS. Contractor shall bear all costs and expenses associated with correcting any Defect or breach of warranty, including necessary disassembly, transportation, reassembly and retesting, as well as reworking, repair or replacement of such Work, disassembly and reassembly of piping, ducts, machinery, Equipment or other Work as necessary to give access to improper, defective or non-conforming Work and correction, removal or repair of any damage to other work or property that arises from the Defect. If Contractor is obligated to repair, replace or renew any Equipment, item or portion of the Work hereunder, Contractor will undertake a technical analysis of the problem and correct the "root cause" unless Contractor can demonstrate to Company's satisfaction that there is not a risk of the reoccurrence of such problem. Contractor's obligations under this Section 12.2 shall not be impaired or otherwise adversely affected by any actual or possible legal obligation or duty of any Subcontractor to Contractor or Company concerning any Defect or breach of warranty.

(b) If (i) Contractor fails to complete or commence with due diligence to complete the correction of any Defect or cure of any breach of warranty as required herein within twenty (20) days after receipt of written request from Company to perform such obligations, or (ii) a Defect cannot be corrected within twenty (20) days and Contractor fails to provide a correction plan within five (5) Business Days after receipt of Company's written request to perform such obligations or thereafter fails to implement the plan with due diligence following Company's approval of the plan, then Company may correct or cause to be corrected such Defect or cure such breach of warranty and Contractor shall be liable for all reasonable costs, charges, and expenses incurred by Company in connection therewith (including reasonable and necessary consultants' fees), and Contractor shall, within fifteen (15) days after request therefore, pay to

Company an amount equal to such reasonable costs, charges, and expenses. Any such request by Company shall be accompanied by proper documentation evidencing such reasonable costs, charges and expenses. Any amounts not paid when due shall accrue interest at the Reference Rate (established as of the first day of the month in which payment is due) from the date due until paid. Company and Contractor agree to treat (and shall cause each of their respective Affiliates to treat) any payment made to Company pursuant to this Section 12.2(b) as an adjustment to the Contract Price unless a final determination (which shall include execution of an Internal Revenue Service Form 870-AD or successor form) provides otherwise.

(c) If, during the Warranty Period, Contractor shall change, repair or replace any major Equipment item or component, Company, in its reasonable discretion and consistent with Applicable Laws or Applicable Permits, may require Contractor to assist Company in conducting any test required by any Applicable Law or Applicable Permit with respect to the affected Equipment; provided, however, in connection with any such test, appropriate allowance with respect to the performance of such Equipment shall be made for the fact that such Equipment may have operated prior thereto. If after running such test, the results indicate Contractor has not fulfilled any of its warranty obligations and there is a degradation in the performance of the Project and such degradation results from the warranty Work performed in accordance with this Article XII, then Contractor shall repair, correct or replace such affected Equipment and assist Company in re-running such test until the results no longer indicate a degradation in the performance of the Project resulting from the warranty Work performed in accordance with this Article XII. If Contractor cannot reasonably correct such degraded warranted performance condition then the Parties shall negotiate an equitable settlement of Company's damages based on the amount and scope of such deficient warranted performance, or if the amount of such deficient warranted performance is considered by Company to be a material breach of the terms of this Agreement, then Company may declare such breach to be a Contractor Event of Default pursuant to Section 15.1.

12.3 REPAIRS AND TESTING BY COMPANY.

During the Warranty Period, in the event of an emergency and if, in the reasonable judgment of Company, the delay that would result from giving notice to Contractor could cause serious loss or damage which could be prevented by immediate action, any action (including correction of Defects) may be taken by Company or a third party chosen by Company. Company shall give notice to Contractor within two (2) Business Days of discovery, and in the case of a Defect, the reasonable cost of correction shall be paid by Contractor. In the event such action is taken by Company, Contractor shall promptly respond within five (5) Business Days after correction efforts are implemented, and shall assist whenever and wherever possible in making the necessary corrections. All such warranties obtained shall be in addition to, and shall not alter the warranties of, Contractor. Upon Company's request, Contractor shall use all reasonable efforts to cause Subcontractors to honor warranties including filing suit to enforce same.

12.4 SUBCONTRACTORS. Contractor shall, for the protection of Contractor and Company, obtain from the Subcontractors such guarantees and warranties with respect to Work performed and Equipment supplied, used and installed hereunder as are reasonably obtainable, which guarantees and warranties shall equal or exceed those set forth in Section 12.1 and shall be made available and assignable to Company to the full extent of the terms thereof upon the expiration of Contractor's warranty hereunder. Company shall be an express third party

beneficiary of all such guarantees and warranties, provided such third party beneficiary rights shall not be effective unless this Agreement has been terminated. If available, Company may require Contractor to secure additional warranty or extended guarantee protection pursuant to a Change Order issued in accordance with the provisions of Article VI. Upon the earlier of the ISFSI Scope Completion Date or termination of this Agreement, Contractor shall deliver to Company copies of all relevant contracts providing for such guarantees and warranties.

12.5 CONDITIONS OF WARRANTIES. The warranties set forth in this Article XII are subject to the following conditions applicable to the item for which Company claims a breach of warranty exists:

(a) Company shall notify Contractor in writing of any Defect in the Work as soon as reasonably practicable after Company becomes aware of such Defect.

(b) Company shall have the right to continue to use the Equipment, including the Apparatus, as applicable, or any part thereof, which may require warranty correction or repair until such time as Company elects to remove such Equipment, or part thereof, as applicable, from service; provided, however, in such event, Company shall release Contractor from any additional claims for further defects or damage incurred as a result of such continued operation.

(c) Company shall use and maintain the Equipment, including the Apparatus, in accordance with the operation and maintenance procedures agreed upon by the Parties pursuant to this Agreement (these procedures shall be written by Contractor as part of Contractor's Work so as to integrate (where applicable) or replace and supersede (where not applicable) the operations and maintenance procedures required by the original manufacturer for the Existing Equipment and Existing Canisters such that Contractor may not assert that Company's failure to comply with any separate requirements from the existing manufacturer limits the warranty provided herein by Contractor).

(d) Completion of payments by Company shall not relieve Contractor of any of its warranty obligations.

12.6 ASSIGNMENT OF WARRANTIES. Contractor shall assign to Company or obtain for Company's benefit the manufacturer's warranties for all of the Equipment, including the Apparatus and other deliverables, which are provided in connection with the Work, but which are not manufactured by Contractor, including for Work performed under Section 12.3. Such assignment of warranties to Company must also allow Company to further assign such warranties.

12.7 SURVIVAL OF WARRANTIES. The provisions of this Article XII shall survive the expiration or termination of this Agreement.

TAB 11

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 17, 2015

Mr. Thomas J. Palmisano
Vice President and Chief Nuclear Officer
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3 - ISSUANCE OF AMENDMENT FOR PERMANENTLY SHUTDOWN AND DEFUELED OPERATING LICENSE AND TECHNICAL SPECIFICATIONS (TAC NOS. MF3774 AND MF3775)

Dear Mr. Palmisano:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 230 to Facility Operating License No. NPF-10, and Amendment No. 223 to Facility Operating License No. NPF-15, for the San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, respectively. The amendments consist of changes to the SONGS facility operating licenses and the Technical Specifications (TSs) in response to your application dated March 21, 2014, as supplemented by letters dated October 1, 2014; and February 23, February 25, and March 18, 2015.

The proposed amendments revise the operating licenses and associated TSs to reflect the permanent cessation of reactor operations and the permanently defueled condition of the reactor vessels at SONGS Units 2 and 3. In general, the changes eliminate those TSs applicable in operating MODES; MODES where fuel is emplaced in the reactor vessel, and certain TSs required for movement of irradiated fuel assemblies. Changes were also made to the TS definitions, administrative controls, and related to programs and procedures. The proposed amendments also revise the facility operating licenses to clarify or remove certain conditions no longer relevant and add conditions consistent with other permanently shutdown and defueled reactors. Related Amendment Nos. 227 and 220 for SONGS Units 2 and 3, respectively, were issued on September 30, 2014, to revise and remove certain requirements from Section 5.0, "Administrative Controls," of the SONGS Units 2 and 3 TSs to reflect the permanently shutdown and defueled staffing and training requirements for SONGS Units 2 and 3 operations staff.

T. Palmisano

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Thomas J. Wengert, Senior Project Manager
Plant Licensing IV-2 and Decommissioning
Transition Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-361 and 50-362

Enclosures:
1. Amendment No. 230 to NPF-10
2. Amendment No. 223 to NPF-15
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv

TAB 12

Internal reports contradict regulators' public findings over San Onofre spent fuel

sandiegouniontribune.com/news/watchdog/story/2019-09-22/internal-reports-contradict-nrc-public-findings-

September 22, 2019

When a 50-ton cask filled with radioactive waste got wedged 18 feet above the bottom of its concrete silo back in August 2018, work crews at the San Onofre nuclear plant were able to lower the container to its intended resting place after nearly an hour.

Majority plant owner Southern California Edison halted plans to transfer millions more pounds of spent nuclear fuel from wet to dry storage while federal regulators investigated what happened and made sure the process was safe.

Federal inspectors found many of the waste-filled canisters had been scraped and scratched as they were lowered into the interim storage facility. Even so, the U.S. Nuclear Regulatory Commission allowed the waste transfer program to resume in July.

Documents recently obtained by The San Diego Union-Tribune show that an agency field inspector reviewing the August 2018 incident issued internal reports noting that the canisters were designed — and certified — to be lowered into the storage vault without any scratches.

NRC inspector Lee Brookhart wrote that the required final safety analysis report and the certificate of compliance and technical specifications call for no scratches on the caskets.

"The original FSAR (final safety analysis report) statement for no scratches mirrored the CoC/TS (Certificate of Compliance and Technical Specifications) design basis that no scratches would ensure the code adherence," Brookhart wrote in March.

NRC officials did not respond Friday to questions about those internal reports. An Edison spokesman said the utility is fully compliant with federal regulations and the reloading work has been proceeding safely.

Edison spokesman John Dobken said Friday the utility is following federal rules.

"There's another process available for licensees: 72.48," Dobken said, referring to the U.S. Code of Federal Regulations section that allows a licensee to make changes in procedures or design of the casks used to store spent nuclear fuel. "That's what we used to account for the incidental contact going forward," he said.

The regulation is here:
https://www.nrc.gov/reading-rm/doc-collections/cfr/part072/

Dobken said that the company visually inspected eight of the canisters and found no evidence that the scratches would prevent the containers from safely storing spent nuclear fuel.

The canisters Edison is relying on to store spent fuel are licensed to be use for two decades.

The current plan calls foreventuallymoving the canisters away from San Diego once a more permanentstoragesite is agreed to. But critics of the process worry that the scratches outside so many of the canisters could make them difficult to move.

“If you have scrapes, scratches and gouges, that is a trigger for cracks to start,” said Donna Gilmore, an activist in San Clemente who runs a community group called San Onofre Safety.

Brookhart, the NRC inspector, concluded in March that a formal design change would be required to allow the canisters to remain in service.

Instead of pursuing changes to the approved canister design process, Edison relied on a different safety standard to argue that its existing method are compliant and safe.

Brookhart did not agree that a different methodology would satisfy the requirements of the canisters’ previous certification.

“I just don’t see how that meets CoC,” the NRC inspector said. “… Essentially the change (in methodology) is adding an alternative to the code to not have to do inspections and repair these new defects.”

Brookhart’s supervisors at the regulatory agency did not embrace the inspector’s conclusions. On July 15, the commission allowed Edison to restart the fuel transfer program and move forward with decommissioning the plant.

“The licensee implemented an oversight program to ensure that contractors conducted decommissioning work activities in accordance with procedural requirements as well as license expectations,” the NRC said in a report to an Edison vice president, Doug Bauder.

“The licensee implemented operational, radiological and housekeeping programs to ensure safe storage of spent fuel,” senior regulators concluded.

San Diego attorney Michael Aguirre, who has filed several lawsuits aimed at stopping the burial of 3.6 million pounds of nuclear waste in the beach north of Oceanside, said the internal reports show that the NRC disregarded its own inspector in favor of Southern California Edison.

“These decisions should be based on professional inspectors and not on lobbyists and political players at the NRC,” Aguirre said. “It underscores why the downloading has to stop because it is interfering with the ability to transfer the canisters to a safer location.”

Questions over the interim storage of nuclear waste at San Onofre have persisted since the plant was closed in 2012. At least 8 million people live within 50 miles of the plant and many of them are scared that the site could present a public health threat.

Under U.S. law, the U.S. government is responsible for the permanent storage of the San Onofre waste — as well as all of the other spent nuclear fuel in North America. But for decades, federal officials have been unable to agree on a permanent storage facility.

The San Onofre decommissioning plan calls for moving the waste into about 80 heavy concrete canisters by the end of next year so Edison can dismantle the rest of the shuttered plant and return the property to its owner, the U.S. Navy.

Two years ago, Edison agreed to make “commercially reasonable” efforts to relocate the San Onofre waste to settle a lawsuit Aguirre filed in 2015.

TAB 13

SAN ONOFRE DECOMMISSIONING
COMMUNITY ENGAGEMENT PANEL MEETING
STATE OF CALIFORNIA, COUNTY OF ORANGE

TRANSCRIPT OF VIDEOTAPED PROCEEDINGS
LAGUNA HILLS, CALIFORNIA
THURSDAY, MARCH 22ND, 2018

Reported by:
Katherine Magner
CSR No. 14083
Job No. 2846039

COMMUNITY ENGAGEMENT PANEL MEMBERS:
DR. DAVID G. VICTOR
CEP CHAIRMAN

JERRY KERN
CEP SECRETARY
DAN STETSON
VICE CHAIRMAN

BILL HORN
SAN DIEGO COUNTY SUPERVISOR
(Not Present)

TOM CAUGHLAN
CAMP PENDLETON

MARNI MAGDA
SIERRA CLUB, ANGELES CHAPTER
TED QUINN
AMERICAN NUCLEAR SOCIETY

STEVE SWARTZ
CITY OF SAN CLEMENTE
GARRY BROWN
ORANGE COUNTY COASTKEEPER

MARTHA MCNICHOLAS
CAPISTRANO UNIFIED SCHOOL DISTRICT
CAPTAIN MEL VERNON
SAN LUIS REY BAND OF MISSION INDIANS

SERGIO FARIAS
MAYOR, SAN JUAN CAPISTRANO
DONNA BOSTON
ORANGE COUNTY SHERIFF'S DEPARTMENT

TOM PALMISANO
VICE PRESIDENT, DECOMMISSION
CHIEF NUCLEAR OFFICER AT SONGS

RICH HAYDEN
CALIFORNIA STATE PARKS

them you need to tell me how you're going to remediate this, and they came back and said we want to go back to the older design.

CHAIRMAN DR. VICTOR: People are going to want to know about these four canisters. Why not take eight or ten days and move them back into the pool, and unload them and reload them? Help us understand. I know, it's early days. 19:05:32

MR. PALMISANO: Sure.

CHAIRMAN DR. VICTOR: Help us understand what the logic process is going to be there. 19:05:45

MR. PALMISANO: Yeah. And let me just -- because I faced this issue back in the mid '90s at the Palisades Nuclear Plant with a loaded canister that had a potential weld defect and got into this very discussion. 19:05:58

So nobody has unloaded a commercial canister, either a bolted cask or a welded cask or canister. Okay. It is possible. What you would do is basically have a mechanism, either to do it in a fuel pool or do it in a dry transfer facility. It's possible either way. 19:06:15

You would take the canister back in. And the first thing you would do is reconnect the valves and find a way to purge the helium and refill its hole with water. Okay.

The biggest technical issue that we've looked at 19:06:29

in the industry over the many years -- not just related to SONGS -- is the thermal transient to actually reintroduce water into a -- let's say a canister with hot fuel, 200-300 degrees C. And the thermal transient that you put the fuel through. Okay. 19:06:44

So once you get it reflooded, cooled down, you would then put that similar machine on, grind out the weld, take the lid off. That's just the mechanics. That's certainly doable.

The real challenge as we would understand it today, and nobody has had to do it yet, is the reflood. Certainly, technically possible. What I would tell you is just I was back in Washington with the NRC last week, if you were just to brainstorm, this would probably be a two- to three-year project to develop the techniques, 19:06:54 19:07:09 pile up the techniques. The NRC would want to have explicit approval on this because of the radiological hazards.

CHAIRMAN DR. VICTOR: To the workers?

MR. PALMISANO: Well, to the workers, yeah. 19:07:20

So when you think about this, you have a canister that has intact fuel rods inside of a sealed canister. This pin problem doesn't affect the canister itself. Okay. So you've got that condition.

You've got to weigh that condition -- if this 19:07:34

TAB 14

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

March 25, 2019

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: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY - $116,000 AND NRC SPECIAL INSPECTION REPORT 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001

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) on August 3, 2018. A final exit briefing was conducted telephonically with Mr. Thomas Palmisano and members of your staff on November 1, 2018, and the details regarding two apparent violations were provided in the subject inspection report dated November 28, 2018, NRC's Agencywide Documents Access and Management System (ADAMS) Accession ML18332A357. An errata to this inspection report was issued on December 19, 2018, ADAMS Accession ML18341A172.

In the letter transmitting the inspection report, we provided you with the opportunity to address the apparent violations identified in the report by either attending a predecisional enforcement conference (PEC) or requesting alternative dispute resolution (ADR). On December 10, 2018, SONGS staff informed the NRC that they requested a PEC. On January 24, 2019, a public PEC was conducted in the Region IV office with you and members of your staff to discuss the apparent violations, their significance, their root causes, and your corrective actions.

Based on the information developed during the inspection and the information that you provided during the PEC, the NRC has determined that two violations of NRC requirements occurred. The violations are cited in Enclosure 1, Notice of Violation and Proposed Imposition of Civil Penalty (Notice), and the circumstances surrounding them are described in the subject inspection report. Violation A involved the failure to ensure that important-to-safety equipment was available to provide redundant drop protection features for a loaded spent fuel canister during downloading operations. Violation B involved the failure to make a timely notification to the NRC Headquarters Operations Center for the August 3, 2018, disabling of important-to-safety equipment.

The NRC considers that Violation A could have resulted in a significant safety consequence because an important-to-safety feature was disabled during a spent fuel canister downloading operation. Therefore, this violation has been categorized in accordance with the NRC Enforcement Policy at Severity Level II. The NRC considers that Violation B impacted the NRC's ability to perform its regulatory oversight function. Therefore, this violation has been categorized in accordance with the NRC Enforcement Policy at Severity Level III.

Because Violation A was associated with a Severity Level II violation, the NRC considered whether credit was warranted for *Identification* and *Corrective Action* in accordance with the civil penalty assessment process in Section 2.3.4 of the NRC Enforcement Policy. The NRC determined that *Identification* credit was not warranted because Violation A was identified through a self-revealing event.

Your corrective actions included: (1) a revised corrective action program that encompasses all dry cask storage operations at SONGS with a defined threshold for problem identification and entry; (2) additional staff training and resources to implement Southern California Edison Company's (SCE's) revised and more intrusive contractor oversight of dry cask storage operations; (3) additional equipment to provide load indications and visual indications for defense-in-depth to prevent a future disabling of important-to-safety downloader slings during spent fuel canister downloading operations; (4) a revised SONGS-specific training program for all dry cask storage workers to ensure that workers understand and know how to perform their assigned roles and responsibilities; (5) revised procedures that provide qualitative and quantitative means to ensure that important steps for dry cask storage operations have been accomplished; and (6) a commitment to enhance future management and executive management oversight through the above programs, policies, and procedures.

During the NRC's follow-up inspections, several weaknesses were identified by the inspection team related to the above-noted corrective actions. The three most significant weaknesses included failures to: (1) establish measures to ensure appropriate quality standards were specified in design documents for the new load monitoring equipment used in the downloading process; (2) ensure that newly-installed load monitoring equipment conformed to the procurement documents; and (3) conduct spent fuel handling operations within established design basis seismic criteria when moving loaded transfer casks from the site's spent fuel buildings to the independent spent fuel storage installation.

In addition, SCE's corrective actions did not adequately address a change to the design and performance requirements for certain structures, systems, and components described in the Holtec UMAX Final Safety Analysis Report (FSAR). At the time of the August 3, 2018, incident, the version of the Holtec UMAX FSAR in effect (i.e., Revision 4) stated that "there is no risk of scratching or gouging" on a canister during downloading operations into the UMAX vault. Following the special inspection, the FSAR was revised to allow scratches on the canisters during downloading operations. Southern California Edison Company used the Title 10 of the *Code of Federal Regulations* (10 CFR) 72.48 process to implement the FSAR change. The NRC determined that SCE's calculations and evaluation did not contain an adequate basis to support the change to the FSAR. As a result, SCE initiated corrective actions to reperform the 10 CFR 72.48 evaluation. The NRC will review SCE's subsequent evaluation to determine if the FSAR design change to allow scratches is acceptable.

Based on the overall assessment of SCE's corrective actions, the NRC has concluded that *Corrective Action* credit is not warranted for Violation A.

Since neither *Identification* credit nor *Corrective Action* credit are warranted for Violation A, the NRC Enforcement Policy provides for a civil penalty that is twice the base civil penalty amount of $58,000 for a total of $116,000.

Because Violation B was associated with a Severity Level III violation and your facility has not been the subject of an escalated enforcement action within the last 2 years, the NRC considered whether credit was warranted for *Corrective Action* in accordance with the civil penalty assessment process in Section 2.3.4 of the NRC Enforcement Policy. Your corrective actions included: (1) making the required notification to the NRC; (2) providing training to shift managers on the NRC reporting requirements; (3) revising your reporting procedures; and (4) establishing biennial refresher training on reportability. We have determined that these actions are sufficiently comprehensive and appropriate. Therefore, the NRC determined that *Corrective Action* credit was warranted, which would not result in a civil penalty for this Severity Level III violation.

Given the above, to emphasize the importance of identification and comprehensive correction of violations, I have been authorized, after consultation with the Director, Office of Enforcement, to issue the enclosed Notice of Violation and Proposed Imposition of Civil Penalty (Notice) in the amount of $116,000 for the Severity Level II violation (Violation A). In addition, issuance of this Notice constitutes escalated enforcement action that may subject you to increased inspection effort.

If you disagree with this enforcement sanction, you may deny the violation, as described in the Notice, or you may 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 employs 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 ADR program can be found in Enclosure 3 and at http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html.

The Institute on Conflict Resolution at Cornell University facilitates the NRC's program as a neutral third party. If you are interested in pursuing this issue through the ADR program, please contact: (1) the Institute on Conflict Resolution at 877-733-9415, and (2) Dr. Janine F. Katanic at 817-200-1151 within 10 days of the date of this letter. You may also contact the Institute on Conflict Resolution for additional information about ADR. Your submitted signed agreement to mediate using the NRC's ADR program will stay the 30-day time period for payment of the civil penalties and the required written response, as identified in the enclosed Notice, until the ADR process is completed.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In particular, you should address actions you have taken or plan to take to improve your corrective actions. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "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. The NRC also includes significant enforcement actions on its Web site at http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions.

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

Sincerely,

Scott A. Morris
Regional Administrator

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

Enclosures:
1. Notice of Violation and Proposed Imposition of Civil Penalty
2. NUREG/BR-0254, Payment Methods
3. NUREG/BR-0317, Enforcement Alternate Dispute Resolution Program

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTY

Southern California Edison Company
San Clemente, California

Docket Nos. 050-00206, 050-00361, 050-00362, 072-00041
License Nos. DPR-13; NPF-10; NPF-15
EA-18-155

During an NRC inspection conducted September 10-14, 2018, two violations of NRC requirements were identified that were considered for escalated enforcement. (Note: three other Severity Level IV violations were identified and documented in the NRC special inspection report.) In accordance with the NRC Enforcement Policy, the NRC proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalty are set forth below:

I. Violation Assessed a Civil Penalty

A. 10 CFR 72.212(b)(3) requires, in part, that each cask used by the general licensee conforms to the terms, conditions, and specifications of a Certificate of Compliance listed in 10 CFR 72.214. 10 CFR 72.214 includes a list of all the approved spent fuel storage casks that can be utilized under the conditions specified in a specific Certificate of Compliance, including Amendment 2 of Certificate of Compliance 072-01040. Certificate of Compliance 072-01040, Amendment 2, Condition 4, "HEAVY LOADS REQUIREMENTS," requires, in part, 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 Specifications, Appendix A, Section 5.2.c.3 requires, in part, 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 the redundant drop protection features were available to prevent uncontrolled lowering of the load during multi-purpose canister transfer operations. 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 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 final safety analysis report.

This is a Severity Level II violation (NRC Enforcement Policy Section 6.3.b.2).
Civil Penalty - $116,000 (EA-18-155)

II. Violation Not Assessed a Civil Penalty

B. 10 CFR 72.75(d)(1) requires, in part, that each licensee shall notify the NRC within 24 hours after the discovery of an event involving spent fuel in which important-to-safety equipment is disabled or fails to function as designed when: (i) the equipment is required by Certificate 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 within the required time period after the discovery of an event involving spent fuel in which important-to-safety equipment was disabled or failed to function as designed when: (i) the equipment was required by Certificate 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.

Specifically, the licensee failed to notify the NRC within the required time period after an event that occurred on August 3, 2018, in which the licensee inadvertently disabled the redundant important-to-safety downloading slings while lowering spent fuel canister 29 into the storage vault, which resulted in the canister resting on a shield ring unsupported by the redundant downloading slings at approximately 18 feet above the fully seated position for approximately 45 minutes. These slings are required by Certificate of Compliance 072-01040, Amendment 2, Condition 4, and Technical Specification 5.2.c.3 to be available and operable during canister transfer operations, and no redundant equipment was available and operable to perform the required safety function.

This is a Severity Level III violation (NRC Enforcement Policy Section 6.9.c.2).

Pursuant to the provisions of 10 CFR 2.201, Southern California Edison Company (SCE) is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, with a copy to the Document Control Desk, Washington, DC 20555-0001, and the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalty (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, the NRC may issue an order or a Demand for Information requiring you to explain why your license should not be modified, suspended, or revoked or why the NRC should not take other action as may be proper. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

You may pay the civil penalty proposed above, in accordance with NUREG/BR-0254 (Enclosure 2) and by submitting to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, a statement indicating when and by what method payment was made, or may

protest imposition of the civil penalty in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice.

Should SCE fail to answer within 30 days of the date of this Notice, the NRC will issue an order imposing the civil penalty. Should SCE elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalty, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation; EA-18-155" and may: (1) deny the violations listed in this Notice, in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalty in whole or in part, such answer may request remission or mitigation of the penalty.

In requesting mitigation of the proposed penalty, the response should address the factors in Section 2.3.4 of the Enforcement Policy. Any written answer addressing these factors pursuant to 10 CFR 2.205, should be set forth separately from the statement or explanation provided pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. Your attention is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalty which subsequently has been determined in accordance with the applicable provisions of 10 CFR 2.205 to be due, this matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

The responses noted above, i.e., Reply to Notice of Violation, Statement as to payment of civil penalty, and Answer to a Notice of Violation, should be addressed to: Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, with a copy to the Document Control Desk, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001 and the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 1600 E. Lamar Blvd., Arlington, TX 76011-4511. 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, it 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 that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (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).

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

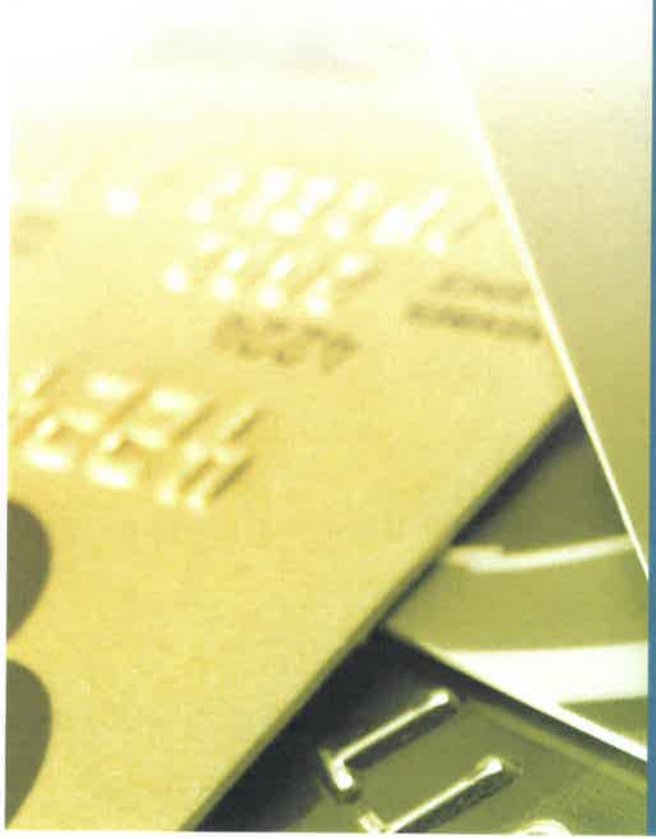
Dated this 25th day of March 2019.

QUESTIONS?

If you have questions, please visit https://www.nrc.gov and search for "License Fees."

Questions may also be directed to the NRC Accounts Receivable Help Desk by e-mail at FEES.Resource@nrc.gov, by phone at (301) 415-7554, or by writing to the address below:

U.S. NUCLEAR REGULATORY COMMISSION
OCFO/DOC/ARB
Mail Stop T9-E10
Washington, DC 20555-0001



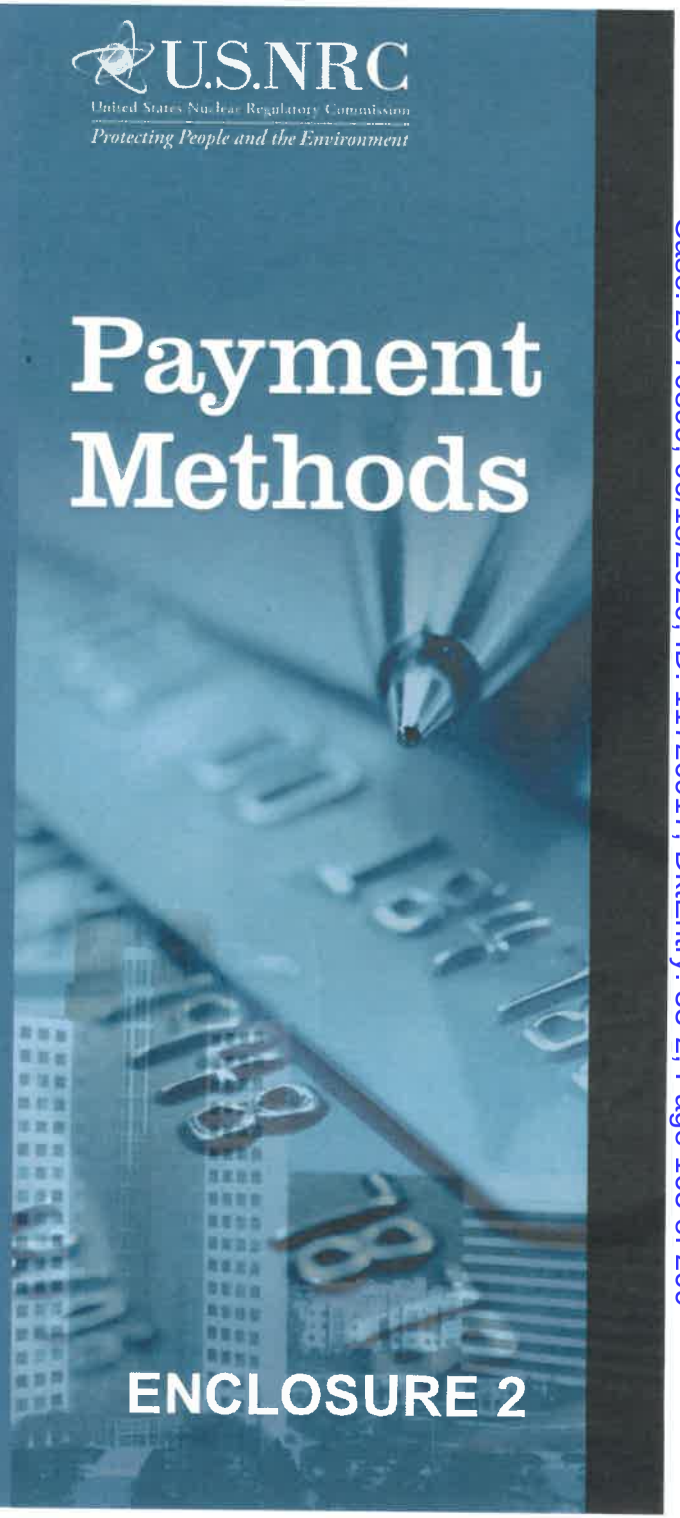
U.S. NUCLEAR REGULATORY COMMISSION
OCFO/DOC/ARB
Mail Stop T-9-E10
Washington, DC 20555-0001
PH (301) 415-7554

NUREG/BR-0254, Rev. 8
February 2018

@NRCgov

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Payment Methods



ENCLOSURE 2

APPROVED BY OMB: NO. 3150–0190

Estimated burden per response to comply with this voluntary collection request: 10 minutes. This brochure provides information about available payment methods. Forward comments about to burden estimate to the Records Management Branch (T6-F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0190), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

NRC accepts the methods described below.

PAYMENT BY AUTOMATED CLEARINGHOUSE

To pay by Automated Clearinghouse / Electronic Data Interchange (ACH/EDI), provide a copy of NRC Form 628 to your financial institution. You may obtain a copy of NRC Form 628 by calling the NRC Accounts Receivable Help Desk at (301) 415-7554.

PAYMENT BY CREDIT CARD

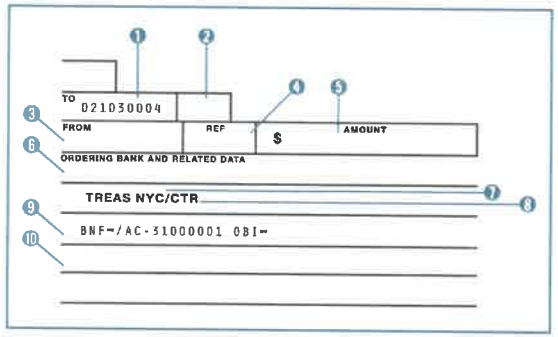
The NRC is currently accepts credit card payments of up to $24,999.99. For payment by credit card, go to Pay.gov, search for "U.S. Nuclear Regulatory Commission Fees" and enter the required information.

You may also mail or fax NRC Form 629 following the directions on the form. To obtain a copy of NRC Form 629 go to http://www.nrc.gov and search for "NRC Form 629" or call the NRC Accounts Receivable Help Desk at (301) 415-7554.

PAYMENT BY FEDWIRE DEPOSIT SYSTEM

The NRC can receive funds through the U.S. Department of the Treasury (Treasury) Fedwire Deposit System. The basic wire message format below complies with the Federal Reserve Board's standard structured third-party format for all electronic funds transfer (EFT) messages.

See the sample EFT message to Treasury below. Each numbered field is described below.



1 RECEIVER-DFI# – Treasury's routing number for deposit messages is 021030004.

2 TYPE-SUBTYPE-CD – The sending bank will provide the type and subtype code.

3 SENDER-DFI# – The sending bank will provide this number.

4 SENDER-REF# – The sending bank will insert this 16-character reference number at its discretion.

5 AMOUNT – The transfer amount must be punctuated with commas and decimal point; use of the "$" is optional. The depositor will provide this item.

6 SENDER-DFI-NAME – The Federal Reserve Bank will automatically insert this information.

7 RECEIVER-DFI-NAME – Treasury's name for deposit messages is "TREAS NYC". The sending bank will enter this name.

8 PRODUCT CODE – A product code of "CTR" for customer transfer should be the first item in the reciever text field. Other values may be entered, if appropriate, using the American Bankers Association's options. A slash must be entered after the product code.

9 AGENCY LOCATION CODE (ALC) – THIS ITEM IS OF CRITICAL IMPORTANCE. IT MUST APPEAR ON THE FUNDS TRANSFER DEPOSIT MESSAGE IN THE PRECISE MANNER AS STATED TO ALLOW FOR THE AUTOMATED PROCESSING AND CLASSIFICATION OF THE FUNDS TRANSFER MESSAGE TO THE AGENCY LOCATION CODE OF THE APPROPRIATE AGENCY. The ALC identification sequence can, if necessary, begin on one line and end on the next line; however, the field tag "BNF=" must be on one line and cannot contain any spaces. The NRC's 8-digit ALC is: BNF=/AC-31000001

10 THIRD-PARTY INFORMATION – The Originator to Beneficiary Information (OBI) field tag "OBI=" signifies the beginning of the free-form third-party text. All other identifying information intended to enable the NRC to identify the deposit—for example, NRC annual fee invoice number, description of fee, 10 CFR 171 annual fee, and licensee name—should be placed in this field.

The optimum format for fields 7, 8, 9, and 10 using an 8-digit ALC is as follows:

TREAS NYC/CTR/BNF=/AC-31000001 OBI=

The optimum format, shown above, will allow 219 character positions of information following the "OBI=" indicator.

If the licensee's bank is not a member of the Federal Reserve System, the nonmember bank must transfer the necessary information and funds to a member bank, which then must transfer the information and funds to the local Federal Reserve Bank.

For a transfer of funds from local Federal Reserve Banks to be recorded on the same day, the transfer must be received at the New York Federal Reserve Bank by 4 p.m., EST. Otherwise, the deposit will be recorded on the next workday.

PAYMENT BY CHECK

Checks should be made payable to the U.S. Nuclear Regulatory Commission with the invoice number, Enforcement Action number, or other information that identifies the payment, written on the check. Mail the check to the following address:

U.S. Nuclear Regulatory Commission
U.S. Bank
P.O. Box 979051
St. Louis, MO 63197-9000

FedEx or overnight mailings must be delivered to the following address:

U.S. Nuclear Regulatory Commission
U.S. Bank Government Lockbox
SL-MO-C2GL
1005 Convention Plaza
St. Louis, MO 63101

TAXPAYER IDENTIFICATION NUMBER

You must file your Taxpayer Identification Number (TIN) with the NRC. Use NRC Form 531 to provide your TIN. You may obtain NRC Form 531 from the NRC Web site at http://www.nrc.gov by searching for "NRC Form 531" or by calling the NRC Accounts Receivable Help Desk at (301) 415-7554.

Mediation Location and Duration

The parties usually hold the mediation at or near one of the NRC's offices. However, the parties may agree on any alternate location. Mediation sessions are usually no longer than 1 day. In some cases, the mediation may take longer with the mutual consent of the parties.

The NRC Mediation Team

The responsible NRC senior manager (i.e., Office Director, Regional Administrator, or his or her designee) will serve as the principal negotiator for the NRC in cases that involve wrongdoing and technical issues. When a case involves discrimination, the Director of the Office of Enforcement will serve as the principal negotiator. The other members of the NRC mediation team typically include an enforcement specialist, an attorney, and a staff representative who is familiar with any technical issues under discussion.

The Confirmatory Order

A CO is a legally binding document that includes the terms of the AIP. The NRC will issue a CO only with the prior written consent of the other party and with a waiver of the right to a hearing. After the entity or the individual has completed the terms of the CO, the NRC will verify that the terms of the CO have been satisfied in a timely manner. Because the CO is legally binding, failing to comply with its terms exposes the entity or individual to additional enforcement action.

Although the substance of the mediation session remains confidential, the details of the settlement will normally be made public via a press release and the publication of the CO in the *Federal Register*.

Timeliness Goals

The timely resolution of issues is one of the goals of the enforcement ADR program. Accordingly, the NRC expects timely progress of a case at each stage of the mediation process. In cases where the parties achieve settlement, the NRC expects to issue a CO within 90 calendar days of the date of the agency's letter offering the ADR option to the other party.

Additional Sources of Information

More information about the NRC's ADR program is available from the following:

- Cornell University's Scheinman Institute on Conflict Resolution
  Toll-Free Number: (877) 733-9415

- The NRC's ADR Program Manager in the Office of Enforcement
  Toll-Free Number: (800) 368-5642 or (301) 287-9527

- The NRC enforcement ADR program on the agency's Web site at www.nrc.gov/about-nrc/regulatory/enforcement/adr.html

NUREG/BR-0317 Rev. 2
May 2018

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Enforcement Alternative Dispute Resolution Program

ENCLOSURE 3

The Program

The U.S. Nuclear Regulatory Commission's (NRC's) enforcement alternative dispute resolution (ADR) program, formerly referred to as "post-investigation ADR," provides an amicable process for resolving enforcement matters. It is intended to produce more timely and effective outcomes for the NRC and an entity (e.g., an NRC licensee, certificate holder, or contractor of an NRC licensee or certificate holder) or an individual who is subject to an enforcement action, through mediation.

The NRC established the post-investigation ADR program in 2004. In 2015, the NRC expanded its scope to include certain types of enforcement cases that do not involve an investigation. Accordingly, the name of this program was changed from "post-investigation ADR" to "enforcement ADR."

Enforcement ADR includes two distinct case types: (1) discrimination cases or other wrongdoing and, (2) nonwillful (traditional) enforcement cases with the potential for civil penalties (not including violations associated with findings assessed through the Reactor Oversight Process). For discrimination cases or other wrongdoing, mediation is used after the completion of an investigation by the NRC Office of Investigations.

As long as the enforcement matter is within the scope of the program, the NRC normally offers enforcement ADR at each of the following stages of the enforcement process: (1) before an initial enforcement action, (2) after the initial enforcement action is taken, typically upon issuance of a notice of violation, and (3) when a civil penalty is imposed but before a hearing request.

Mediation is an informal process in which a trained and experienced mediator works with the parties to help them reach a resolution. The parties are the NRC and the entity or individual in the mediation. The mediator focuses the attention of the parties on their needs and interests rather than on their stated positions. Mediation gives the parties an opportunity to discuss issues, clear up misunderstandings, identify creative ways to address issues, find areas of agreement, and resolve their dispute.

Participation in the program is entirely voluntary. The NRC and the entity or the individual may withdraw from the mediation process at any time.

The Program Administrator

The NRC has a contract with the Cornell University Scheinman Institute on Conflict Resolution (Cornell) to serve as the program administrator for the enforcement ADR program. Cornell manages the logistics associated with enforcement ADR, including working with the parties to select a mediator from Cornell's roster of mediators. Cornell uses a network of independent and experienced mediators who help the parties find areas of agreement and settle their dispute.

The Mediator

The mediator is an experienced neutral individual who is mutually selected by the parties. He or she has no stake in the outcome of the mediation or any power to make decisions that may bind either party. The role of the mediator is to facilitate communication between the parties and to provide an environment where the parties can address their differences. The mediator uses consensus-building skills and knowledge of negotiation to help the parties find ways to overcome any misunderstandings and find areas of agreement. The mediator does not act as legal counsel or provide legal advice. Each party should consult an attorney for legal advice as appropriate.

The Mediation Process

Historically, most enforcement ADR mediations have occurred at the first stage of the enforcement process (i.e., before an initial enforcement action). In those cases, the NRC presents the entity or the individual with the opportunity to engage in mediation with the agency before it makes an enforcement decision. If the entity or the individual elects ADR, Cornell will help the NRC and the entity or the individual, jointly select a mediator. After selecting a mediator, the parties, in coordination with the mediator, set a date and place for the mediation. Typically, the mediator holds a premediation teleconference with the parties to discuss logistics or any special needs.

During the mediation, the mediator will give the parties an opportunity to discuss their views on the issue. Often, the mediator will meet privately with each party to develop a clear understanding of the party's perspective and explore and assess options. Although the mediator does not have any power to make decisions that may bind either party, he or she may ask questions intended to help the parties assess the merits of their positions, help them converse in a respectful atmosphere, and identify potential settlement options.

If the parties reach a settlement agreement during the mediation session, they will typically document the terms of their agreement in writing by developing an agreement in principle (AIP) document. The AIP is not enforceable by either party against the other, but it is the basis on which the NRC drafts a confirmatory order (CO). The CO is a legally binding document used to confirm the commitments made in the AIP. However, if the parties do not reach a settlement agreement, the traditional enforcement process resumes—that is, the enforcement process continues as it would have if the parties had not engaged in ADR.

Confidentiality

Although the terms of an ADR settlement become publicly available through the issuance of the CO, with certain exceptions, the substance of the discussions during the mediation session is confidential. The mediator is prohibited from discussing the mediation proceedings, testifying on anyone's behalf concerning the mediation, or submitting a report on the substance of the discussions.

Cost

The NRC and the entity or individual, equally share the fees and travel expenses of the mediator and any meeting room fees. However, each party is responsible for its own expenses, such as travel, lodging, and legal representation.

NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY - $116,000 AND NRC SPECIAL INSPECTION REPORT 050-00206/2018-005, 050-00361/2018-005, 050-00362/2018-005, 072-00041/2018-001 DATED - MARCH 25, 2019

DISTRIBUTION:

RidsOeMailCenter Resource;
RidsSecyMailCenter Resource;
RidsEdoMailCenter Resource;
RidsOiMailCenter Resource;
SMorris, RA
MShaffer, DRA
TPruett, DNMS
LHowell, DNMS
JThompson, DNMS
JKatanic, DNMS
VDricks, ORA
DCylkowski, ORA
RSun, NMSS
R4_DNMS_ADMIN
KMorgan-Butler, OEDO
RidsNmssOd Resource;
RidsOcaMailCenter Resource;
EDO_Managers;
RidsRgn1MailCenter Resource;
BMaier, ORA
MHerrera, DRMA
MVasquez, ORA
JKramer, ORA
CAlldredge, ORA
JWeaver, ORA
JPeralta, OE
AMoreno, CA
JWeil, CA
R4DNMS_FCDB
RidsOgcMailCenter Resource;
RidsOigMailCenter Resource;
RidsOcfoMailCenter Resource;
RidsRgn3MailCenter Resource;
GWilson, OE
FPeduzzi, OE
NHilton, OE
SWoods, OE
LSreenivas, OE
RErickson, DNMS
JCook, DNMS
SHoliday, NMSS
MBurgess, NMSS
MMcCoppin, OEDO

S:\RAS\ACES\ENFORCEMENT_EA CASES - OPEN\SONGS EA-18-155 canister\Final Action\NOVCP_EA-18-155_SONGS.docx
ADAMS ACCESSION NUMBER: ML19080A208

☒SUNSI Review: By: JGK | ADAMS: ☒ Yes ☐ No | ☐ Non-Publicly Available ☒ Publicly Available | ☒Non-Sensitive ☐ Sensitive | Keyword:

OFFICE	SES:ACES	HP:FCDB	SHP:FCDB	BC:FCDB	TL:ACES	RC
NAME	JKramer	ESimpson	LBrookhart	JKatanic	GVasquez	DCylkowski
SIGNATURE	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/
DATE	02/22/19	02/27/19	02/26/19	02/27/19	03/04/19	02/28/19
OFFICE	D:DNMS	D:OE	DD:DSFM	OGC	RA	
NAME	TPruett	GWilson	CRegan	MSimon	SMorris	
SIGNATURE	/RA/	/RA/ E	/RA/ E	/RA/ E	/RA/	
DATE	03/5/19	03/14/19	03/12/19	03/13/19	03/21/19	

OFFICIAL RECORD COPY

TAB 15

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

August 17, 2018

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

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

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

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

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

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

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

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

BACKGROUND AND BASIS

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

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

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

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

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

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

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

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

SCOPE

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

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

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

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

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

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

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

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

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

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

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

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

GUIDANCE

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

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

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

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

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

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

DISTRIBUTION:
KKennedy, ORA
SMorris, ORA
TPruett, DNMS
LHowell, DNMS
JKatanic, DNMS
LBrookhart, DNMS
MLayton, NMSS
ARivera-Varona, NMSS
VDricks, ORA
BMaier, ORA
CLipa, DNMS/RIII
JTrapp, DNMS/RI
TInverso, OEDO
AMoreno, OCA
JWeil, OCA

ADAMS ACCESSION NUMBER: ML18229A203

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

OFFICE	DNMS:FCDB	DNMS:DD	DNMS:D
NAME	JFKatanic	LLHowell	TWPruett
SIGNATURE	*/RA/ LLH for*	/RA/	/RA/
DATE	8/17/18	8/17/18	8/17/18

OFFICAL RECORD COPY

TAB 16

NRC NEWS
Office of Public Affairs, Region IV
Arlington, TX. 76011-4511
www.nrc.gov

No: IV-19-012 May 21, 2019
Contact: Victor Dricks, 817-200-1128

NRC Has Determined Fuel Loading Can Be Safely Resumed at San Onofre Nuclear Generating Station

The Nuclear Regulatory Commission has determined that fuel loading can be safely resumed at the San Onofre Nuclear Generating Station. The San Clemente, Calif., plant is owned by Southern California Edison and permanently shut down in 2013.

Fuel loading operations were suspended following an Aug. 3, 2018, incident involving a loaded spent fuel storage canister that was misaligned and became stuck on a flange while being lowered into a storage vault. Information about the incident and the NRC's response is available on the NRC website.

The NRC made its determination following extensive review of technical data submitted by Edison regarding the possible effects of scratching on spent fuel canisters during fuel loading operations.

The NRC will hold a virtual public meeting/webinar from 2-3 p.m. Central Time (12-1 p.m. Pacific Time) on June 3. Members of the public will have an opportunity to submit written comments and questions via the webinar user interface following a presentation by NRC officials. NRC staff will provide participation guidance during the webinar.

Interested members of the public should register for the webinar on the NRC website, at which time a confirmation e-mail will be sent with details for joining the webinar via computer or mobile device. There is an option to listen via a phone bridge; however participants must first register for the webinar to obtain the phone bridge number.

TAB 17

Division of Spent Fuel Management
Interim Staff Guidance – 2, Revision 2

Issue: **Fuel Retrievability in Spent Fuel Storage Applications**

Introduction:

This Interim Staff Guidance (ISG) provides guidance to the staff for determining whether an application submitted under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72 (Ref. 1), "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste" sufficiently demonstrates that the system is designed to allow ready retrieval of spent fuel. U.S. Nuclear Regulatory Commission (NRC) inspectors use the ISG and Inspection Procedures IP-60854 and IP-60855 (Ref. 2 and Ref. 3) during inspections to verify that licensees comply with 10 CFR 72.122(l). This ISG does not apply to submitted applications seeking approval under 10 CFR Part 71, "Packaging and Transportation of Radioactive Material" (Ref. 4). This guidance is not a regulation or a requirement as it addresses options to meet the regulation. Additionally, applicants may propose alternate methods to comply with the regulation which would be evaluated on a case-by-case basis. A background section is included in Appendix A.

Regulatory Basis

The regulations for safe storage of spent nuclear fuel for licensees are in 10 CFR Part 72. Retrievability is specifically mentioned in 10 CFR 72.122(l), which states that "storage systems must be designed to allow ready retrieval of spent fuel, high-level radioactive waste, and reactor-related greater than class C waste for further processing or disposal." The NRC interprets this regulation to require that a storage system be designed to allow for ready retrieval in the initial design, amendments to the design, and in license renewal, through the aging management of the design. Retrievability is applicable only during normal and off-normal conditions; it does not apply to accident conditions (Ref. 5). The retrievability requirement applies to all general licensed and specific licensed independent spent fuel storage installations (ISFSIs), including wet storage ISFSIs, however most of current licensed ISFSIs use only dry storage. 10 CFR 72.236(m) states that certificate of compliance (CoC) holders should design for retrievability; "[t]o the extent practicable in the design of spent fuel storage casks, consideration should be given to compatibility with removal of the stored spent fuel from a reactor site, transportation, and ultimate disposition by the Department of Energy."

Applicability:

The staff will apply ISG-2, Rev. 2 in reviewing ISFSI applications conducted in accordance with NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems" (Ref. 6), NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities" (Ref. 7), or NUREG-1927, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel" (Ref. 8 and 9).

This revision of ISG-2 redefines retrievability and supersedes the definition of retrievability in NUREG-1536, NUREG-1567, and NUREG-1927 and applicable storage

ISGs. The previous revision of ISG-2, Rev. 1 (Ref. 10) is superseded in its entirety by ISG-2, Rev. 2.

Technical Review Guidance

ISG-2, Rev. 2 defines ready retrieval as "the ability to safely remove the spent fuel from storage for further processing or disposal." In order to demonstrate the ability for ready retrieval, a licensee should demonstrate it has the ability to perform any of the three options below. These options may be utilized individually or in any combination or sequence, as appropriate.

A. remove individual or canned spent fuel assemblies from wet or dry storage,
B. remove a canister loaded with spent fuel assemblies from a storage cask/overpack,
C. remove a cask loaded with spent fuel assemblies from the storage location.

The NRC's licensing reviews and inspection oversight of the design, fabrication, construction, and operation of an ISFSI, assures the requirements of 10 CFR Part 72, including retrievability, are maintained during the initial storage period. When spent fuel is stored beyond the initial NRC-approved period of operation, 10 CFR 72.42 requires a licensee renew its storage license. Applications for renewal must contain revised technical requirements and operating conditions (fuel storage, surveillance and maintenance, and other applicable 10 CFR Part 72 requirements) that address aging mechanisms and aging effects that could affect structures, systems, and components (SSCs) relied upon for the safe storage of spent fuel. The renewal application must include (1) time-limited aging analyses (TLAAs), if applicable, that demonstrate that SSCs important to safety will continue to perform their intended function for the requested period of extended operation, and (2) aging management programs (AMPs) for management of issues associated with aging that could adversely affect SSCs important to safety.

In verifying that all applicants for an initial ISFSI license or an ISFSI license amendment meet the retrievability requirement of 10 CFR 72.122(l), the reviewer must find there is reasonable assurance the storage system design allows for ready retrieval by the use of option A, B, or C or a combination of the options. A dry storage system may demonstrate retrievability by the use of known and controlled fuel selection, limits on the loading temperature, known atmospheric environment, and transfer cask or canister temperature control (Ref. 11 and 12). The reviewer should also verify that applications for all storage systems identify the SSCs important to safety and the SSC subcomponents that are relied upon for ready retrieval. The reviewer should further verify that the Technical Specifications (TSs) included in the application provide for the maintenance of SSCs relied upon for ready retrieval. The revised definition of retrievability does not obviate the need for appropriate control of parameters during loading, vacuum drying, and transfer to the storage location (e.g., dry storage pad).

When an applicant for an initial ISFSI license or an applicant for an amendment to an ISFSI license relies on Option A to demonstrate ready retrieval, the reviewer should confirm that the applicant demonstrated the fuel assemblies will not exhibit gross degradation, and will be removable. Additional review will be needed in the case where there is an assembly with gross degradation or an assembly contains rods with breaches greater than a pinhole leak or a hairline crack (i.e., gross ruptures that could lead to release of fuel particulates per ISG-1, Rev. 2 [Ref. 12]). The reviewer should confirm

that the applicant demonstrates the fuel assembly can be placed inside a secondary container, as described in ISG-1 as a “can for damaged fuel.” The secondary container must confine the fuel particulate to a known volume and be capable of removal.

If an applicant for an initial dry storage ISFSI license or an applicant for an ISFSI license amendment relies upon Option A to demonstrate ready retrieval, it is likely the storage cask/canister will, at some point, need to be moved from the storage location to a location where the spent fuel assemblies can be removed from the cask/canister. When the reviewer anticipates that the cask/canister will have to be moved, the reviewer should confirm the applicant relying upon Option A to demonstrate ready retrieval, also demonstrates ready retrieval under Option B or Option C. This is consistent with the previous guidance on fuel retrievability.

When an applicant for an initial ISFSI license or for an ISFSI license amendment demonstrates ready retrieval with Option B or Option C, the continued ready retrieval of the storage system should be addressed in its TS. However, in addition to the TS, an applicant may also propose to implement a program to identify, monitor, and mitigate possible degradation that could impact the intended function of the dry storage system’s SSCs and subcomponents of the dry storage system, that are relied upon to comply with the retrievability requirements.

The NRC reviewer of an application for renewal of an ISFSI license should verify the 10 CFR 72.122(l) retrievability requirement is met, by ensuring that the approved design bases for the item being relied upon in the option(s) chosen (e.g., fuel assembly, cask, or canister) to demonstrate ready retrieval, including any programs implemented, has not been altered. Additionally, the reviewer should verify that the AMPs and TLAAs provide reasonable assurance that the approved design bases will be maintained during the period of extended operation. This will include reviewing operating experience, including inspections and analyses performed during the initial storage period for ensuring SSCs relied upon for ready retrieval were maintained. The reviewer should refer to Draft NUREG-1927, Rev. 1 (Ref. 8) for additional guidance.

CoC holders and applicants for a CoC are not required by regulation to demonstrate retrievability under 10 CFR 72.122(l); however, 10 CFR 72.236(m), which applies to CoC holders, states that retrievability should be considered to the extent practicable in the design to consider removal of the spent fuel from storage, transportation, and ultimate disposition. When a CoC applicant for an initial certificate, amendment, or revision chooses to incorporate retrievability aspects, the reviewer should confirm the retrievability aspects are technically justified and verify that Part 72 requirements affected by retrievability are evaluated and met. This may include the NRC reviewer confirming that the design for the dry storage system includes an evaluation for potential degradation mechanisms for both the storage cask/canister and the spent fuel to assure that the design of the system has considered removal of the spent fuel from storage during the storage term. Note that the general licensee must comply with the retrievability requirement in 10 CFR 72.122(l), and should demonstrate that canister/casks meet the amendment loading requirements.

Recommendation:

This ISG recommends the following definition to be used by staff when evaluating Part 72 applications:

> Ready retrieval: The ability to safely remove the spent fuel from storage for further processing or disposal.
>
> Acceptable means for removing the spent fuel from storage include the ability to perform any of the three options below. These options may be utilized individually or in any combination or sequence, as appropriate. :
>
> A. remove individual or canned spent fuel assemblies from wet or dry storage,
> B. remove a canister loaded with spent fuel assemblies from a storage cask/overpack,
> C. remove a cask loaded with spent fuel assemblies from the storage location.

The staff recommends the definitions for ready retrieval be incorporated into NUREG-1536, NUREG-1567, and NUREG-1927. These definitions do not necessitate any actions for currently approved storage systems.

Approved: **/RA/** **4/26/16**
Mark Lombard, Director **Date**
Division of Spent Fuel Management

Appendix A

This Appendix is provided to give insight on the history and evolution of the regulatory requirement of fuel retrievability.

Section 141(b)(1)(C) of the Nuclear Waste Policy Act (NWPA) of 1982, as amended (Ref. 13), requires that each monitored retrievable storage (MRS) facility be designed "…to provide for the ready retrieval of such spent fuel and waste for further processing or disposal." The Nuclear Regulatory Commission (NRC) codified this portion of the NWPA in its 1988 final rulemaking "Licensing Requirements for the Independent Spent Fuel Storage of Spent Nuclear Fuel and High-Level Radioactive Waste" (Ref. 14), which added MRSs to the scope of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72 and required retrievability for all independent spent fuel storage installations (ISFSIs), 10 CFR 72.122(l).

For general and specific licensees, the regulation regarding retrievability is 10 CFR 72.122(l), which requires that "storage systems must be designed to allow ready retrieval of spent fuel, high-level radioactive waste, and reactor-related greater than class C waste for further processing or disposal." It is supported by 10 CFR 72.122 (h)(1), which requires that, for confinement barriers and systems, "The spent fuel cladding must be protected during storage against degradation that leads to gross ruptures or the fuel must be otherwise confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. This may be accomplished by canning of consolidated fuel rods or unconsolidated assemblies or other means as appropriate." 10 CFR 72.236(m) directs that certificate of compliance (CoC) holders and applicants consider retrievably in cask design. The regulation states that, "[t]o the extent practicable in the design of spent fuel storage casks, consideration should be given to compatibility with removal of the stored spent fuel from a reactor site, transportation, and ultimate disposition by the Department of Energy."

Additionally, the NRC has previously recognized that "in the interest of decreasing radiation exposures, storage casks should be designed to be compatible with transportation and Department of Energy [DOE] design criteria to the extent practicable… to the extent that cask designers can avoid return of the spent fuel from dry cask storage to reactor basins for transfer to a transport cask before moving it off site for disposal" (Ref. 15).

The NRC staff's previous position on retrievability, as stated in interim staff guidance (ISG) - 2, Rev. 1 (Ref. 10), defined ready retrieval as "the ability to move a canister containing spent fuel to either a transportation package or to a location where the spent fuel can be removed. Ready retrieval also means maintaining the ability to handle individual or canned spent fuel assemblies by the use of normal means."

The guidance for retrievability in ISG-2, Rev. 1 was developed when an operating repository was expected to be operating in the near future. As of 2015, the duration of the storage of spent fuel storage at an ISFSI or MRS remains uncertain. Therefore, the staff re-assessed the regulatory necessity and practical impact of maintaining and confirming the ability to handle an individual fuel assembly from the canister or cask by normal means as part of the guidance on retrievability.

The NRC's licensing reviews and inspection oversight of the design, fabrication, construction, and operation of an ISFSI, assures that the safety and retrievability requirements of 10 CFR Part 72 are maintained during the initial storage period. When spent fuel storage will continue beyond the initial NRC-approved period of operation, the NRC's storage regulations that 10 CFR 72.240 require that renewal applications contain revised technical requirements and operating conditions (fuel storage, surveillance and maintenance, and other Part 72 requirements) that address aging mechanisms and aging effects that could affect structures, systems, and components (SSCs) relied upon for the safe storage of spent fuel. The renewal application must include (1) time-limited aging analyses (TLAAs), if applicable, that demonstrate that SSCs important to safety will continue to perform their intended function for the requested period of extended operation, and (2) aging management programs (AMPs) for management of issues associated with aging that could adversely affect SSCs important to safety.

Under the guidance of ISG-2, Rev. 1, if a licensee's ability to demonstrate ready retrieval relies on the handling of each individual fuel assembly from a canister or cask by normal means, then periodic monitoring or inspections may be required to verify the condition of the fuel and the internal components of the storage system. Because of the difficulties in accessing the spent fuel and the interior components of some storage systems, opening the storage system may be necessary to conduct inspection, monitoring, and remediation. Opening a storage system is labor intensive, but more importantly, it exposes workers to additional dose, and particularly for welded canisters, may require breaching and reestablishing the confinement boundary with no additional safety benefit. Additionally, it is not current practice to open the storage system to verify fuel condition.

Consistent with the staff's ongoing review of the regulatory framework for spent fuel storage and transportation (see COMSECY-10-0007, Ref. 16), the staff began exploring alternatives to the guidance on the application of ready retrieval. The staff's review has centered on redefining the ability of the fuel assemblies to be removed from a canister or cask by normal means, but maintaining the ability of the canister or cask to be removed from the storage location. By redefining guidance on the ability to remove the individual spent fuel assemblies or canned assemblies by normal means and providing alternatives, the spent fuel would still be retrieved safely and be readied for transportation consistent with the law and regulations. In addition this approach assures that the confinement of spent fuel in dry storage is maintained without the potential negative impacts that could may accompany opening the storage system.

In an effort to engage stakeholders in this discussion and solicit stakeholder views, the staff held two public meetings on July 27, 2011 and August 16, 2012 (Ref. 17 and 18). Additionally, in January 2013, NRC issued a *Federal Register* notice (Ref. 19) requesting public comment on several topics, including retrievability. The NRC received 18 sets of comments on the *Federal Register* notice (Ref. 20). Staff work in this area was delayed until recently due to work on the storage renewal regulatory framework and high burnup fuel related activities. For this reason, the staff held an additional public meeting on July 29, 2015, to provide an update on the staff's work on retrievability (Ref. 21).

In addition to conducting the public dialogue, the staff considered the methods used in other countries for the dry storage of spent nuclear fuel and reviewed international guidance for spent fuel storage. The staff participated in several multilateral working groups related to extended spent fuel storage. The staff reviewed the International Atomic Energy Agency's (IAEA) Specific Safety Guide No. SSG-15, "Storage of Spent

Nuclear Fuel" (Ref. 22). This IAEA guide is consistent with the NRC's current position that spent fuel should be retrievable under normal and off-normal design conditions. The revision of ISG-2, Rev. 2 does not change this view. The IAEA's guidance states retrievability is also applicable during accident conditions, which differs from the NRC's position (Ref. 5).

This updated guidance, ISG-2, Rev. 2, presents a practical approach for implementation of fuel retrievability that will continue to protect public health and safety while reducing the negative impacts associated with the approach established in ISG-2, Rev.1.

References:

1. 10 CFR Part 72. *Code of Federal Regulations*, Title 10, Energy, Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." Washington, DC.

2. U.S. Nuclear Regulatory Commission. 2008. "Preoperational Testing of an Independent Spent Fuel Storage Installations," Inspection Procedure-60854, Washington DC. Agencywide Document Access and Management System (ADAMS) Accession No. ML073100468.

3. U.S. Nuclear Regulatory Commission. 2008. "Operation of an Independent Spent Fuel Storage Installations," Inspection Procedure-60855, Washington DC. ADAMS Accession No. ML073100489.

4. 10 CFR Part 71. *Code of Federal Regulations*, Title 10, Energy, Part 71, "Packaging and Transportation of Radioactive Material." Washington, DC.

5. U.S. Nuclear Regulatory Commission. 1998. "Post Accident Recovery and Compliance with 10 CFR 72.122(l)," Spent Fuel Storage and Transportation ISG-3, Washington, DC. ADAMS Accession No. ML092800380.

6. U.S. Nuclear Regulatory Commission. 2010. "Standard Review Plan for Spent Fuel Dry Cask Storage Systems at a General Facility," NUREG-1536, Revision 1, Washington, DC. ADAMS Accession No. ML101040620.

7. U.S. Nuclear Regulatory Commission. 2000. "Standard Review Plan for Spent Fuel Dry Storage Facilities," NUREG-1567, Washington, DC. ADAMS Accession No. ML003686776.

8. U.S. Nuclear Regulatory Commission. 2015. "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel," Draft NUREG-1927, Rev. 1, Washington, DC. ADAMS Accession No. ML15068A331.

9. U.S. Nuclear Regulatory Commission. 2011. "Standard Review Plan of Spent Fuel Dry Cask Storage System Licenses and Certificates of Compliance" NUREG-1927, Washington, DC. ADAMS Accession No. ML111020115.

10. U.S. Nuclear Regulatory Commission. 2010. "Fuel Retrievability," Division of Spent Fuel Storage and Transportation ISG-2, Revision 1, Washington, DC. ADAMS Accession No. ML100550861.

11. U.S. Nuclear Regulatory Commission. 2003. "Cladding Considerations for the Transportation and Storage of Spent Fuel," Spent Fuel Project Office ISG-11, Revision 3, Washington, DC. ADAMS Accession No. ML033230335.

12. U.S. Nuclear Regulatory Commission. 2007. "Classifying the Condition of Sp3n5 Nuclear Fuel for Interim Storage and Transportation Based on Function," ISG-1, Revision 2, Washington, DC. ADAMS Accession No. ML071420268.

13. 42 U.S. Code §10101 et se. (1982). Nuclear Waste Policy Act (NWPA) of 1982, as amended.

14. 53 FR 31651; August 19, 1988. "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste." *Federal Register*, U.S. Nuclear Regulatory Commission, Washington, DC.

15. 55 FR 29181, July 18, 1990. "Storage of Spent Fuel in NRC Approved Storage Casks at Power Reactor Sites." *Federal Register*, U.S. Nuclear Regulatory Commission, Washington, DC.

16. U.S. Nuclear Regulatory Commission. 2010. COMSECY-10-0007: "Project Plan for the Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel." ADAMS Accession No. ML101390216.

17. U.S. Nuclear Regulatory Commission. 2011. "Summary of July 27, 2011 Workshop on Enhancements to Licensing and Inspection Programs," ADAMS Accession No. ML113000303.

18. U.S. Nuclear Regulatory Commission. 2012. "Summary of the August 16-17, 2012 Meeting to Obtain Stakeholder Feedback on Enhancements to the Licensing and Inspection Programs for Spent Fuel Storage and Transportation Under 10 CFR Parts 71 and 72," ADAMS Accession No. ML12261A069.

19. 78 FR 3853; July 17, 2013. "Retrievability, Cladding Integrity and Safe Handling of Spent Fuel at an Independent Spent Fuel Storage Installation and During Transportation." *Federal Register*, U.S. Nuclear Regulatory Commission, Washington, DC.

20. U.S. Nuclear Regulatory Commission. 2015. Package of Public Comments: "Public Comments on *Federal Register* Notice on Retrievability and Cladding Integrity," ADAMS Accession No. ML15110A370.

21. U.S. Nuclear Regulatory Commission. 2015. "Summary of the July 29, 2015 Public Meeting on Retrievability of Spent Fuel at an Independent Spent Fuel Installation," ADAMS Accession No. ML15216A272.

22. International Atomic Energy Agency (IAEA). 2012. IAEA Safety Standards Series No. SSG-15: "Storage of Spent Nuclear Fuel."

TAB 18

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-2157
Volume 1

Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel

Final Report

Office of Nuclear Material Safety and Safeguards

AVAILABILITY OF REFERENCE MATERIALS IN NRC PUBLICATIONS

NRC Reference Material

As of November 1999, you may electronically access NUREG-series publications and other NRC records at NRC's Public Electronic Reading Room at http://www.nrc.gov/reading-rm.html. Publicly released records include, to name a few, NUREG-series publications; *Federal Register* notices; applicant, licensee, and vendor documents and correspondence; NRC correspondence and internal memoranda; bulletins and information notices; inspection and investigative reports; licensee event reports; and Commission papers and their attachments.

NRC publications in the NUREG series, NRC regulations, and Title 10, "Energy," in the *Code of Federal Regulations* may also be purchased from one of these two sources.

1. The Superintendent of Documents
   U.S. Government Printing Office
   Mail Stop SSOP
   Washington, DC 20402–0001
   Internet: bookstore.gpo.gov
   Telephone: 202-512-1800
   Fax: 202-512-2250
2. The National Technical Information Service
   Springfield, VA 22161–0002
   www.ntis.gov
   1–800–553–6847 or, locally, 703–605–6000

A single copy of each NRC draft report for comment is available free, to the extent of supply, upon written request as follows:

Address: U.S. Nuclear Regulatory Commission
Office of Administration
Publications Branch
Washington, DC 20555-0001
E-mail: DISTRIBUTION.RESOURCE@NRC.GOV
Facsimile: 301–415–2289

Some publications in the NUREG series that are posted at NRC's Web site address http://www.nrc.gov/reading-rm/doc-collections/nuregs are updated periodically and may differ from the last printed version. Although references to material found on a Web site bear the date the material was accessed, the material available on the date cited may subsequently be removed from the site.

Non-NRC Reference Material

Documents available from public and special technical libraries include all open literature items, such as books, journal articles, transactions, *Federal Register* notices, Federal and State legislation, and congressional reports. Such documents as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings may be purchased from their sponsoring organization.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at—

The NRC Technical Library
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852–2738

These standards are available in the library for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from—

American National Standards Institute
11 West 42nd Street
New York, NY 10036–8002
www.ansi.org
212–642–4900

Legally binding regulatory requirements are stated only in laws; NRC regulations; licenses, including technical specifications; or orders, not in NUREG-series publications. The views expressed in contractor-prepared publications in this series are not necessarily those of the NRC.

The NUREG series comprises (1) technical and administrative reports and books prepared by the staff (NUREG–XXXX) or agency contractors (NUREG/CR–XXXX), (2) proceedings of conferences (NUREG/CP–XXXX), (3) reports resulting from international agreements (NUREG/IA–XXXX), (4) brochures (NUREG/BR–XXXX), and (5) compilations of legal decisions and orders of the Commission and Atomic and Safety Licensing Boards and of Directors' decisions under Section 2.206 of NRC's regulations (NUREG–0750).

NUREG-2157
Volume 1

Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel

Final Report

Manuscript Completed: August 2014
Date Published: September 2014

Waste Confidence Directorate
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

COVER SHEET

Responsible Agency: U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards

Title: NUREG–2157, Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel – Final Report, Volumes 1 and 2

For additional copies or questions about this Generic Environmental Impact Statement, contact:

Sarah Lopas
NEPA Communications Project Manager

Phone: 1-800-368-5642, extension 287-0675

Email: Sarah.Lopas@nrc.gov

U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Waste Confidence Directorate
Mail Stop 3WFN 14-C64
11555 Rockville Pike
Rockville, Maryland 20852

Executive Summary

This summary describes the contents of the U.S. Nuclear Regulatory Commission's (NRC's) Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (GEIS). It briefly discusses the proposed action (a rulemaking), alternatives to the proposed action, and the NRC's recommendation to the Commission. It also describes the NRC's determinations regarding the environmental impacts of at-reactor and away-from-reactor continued storage of spent nuclear fuel (spent fuel) over short-term, long-term, and indefinite timeframes, including the NRC's analysis of spent fuel pool leaks and fires.

ES.1 What is Waste Confidence?

Historically, Waste Confidence has been the NRC's generic determination regarding the technical feasibility and environmental impacts of safely storing spent fuel beyond the licensed life for operations of a nuclear power plant. The Commission incorporated the generic determination in its regulations at Title 10 of the *Code of Federal Regulations* (CFR) 51.23, which satisfied the NRC's obligations under the National Environmental Policy Act of 1969, as amended (NEPA), with respect to the continued storage of spent fuel for commercial reactor licenses, license renewals, and spent fuel storage facility licenses and license renewals.

Continued Storage applies to the storage of spent fuel *after* the end of the licensed life for operations of a nuclear reactor and *before* final disposal in a permanent repository.

ES.2 Why Did the NRC Change the Name of the Generic Environmental Impact Statement and Rule?

During the public comment period on the draft GEIS and proposed Rule, the NRC asked four specific questions, one of which was, "Should the title of the rule be changed in light of a GEIS being issued instead of a separate Waste Confidence Decision?" The NRC received an overwhelming number of comments in favor of changing the name of the Rule; therefore, the title of the *Federal Register* Notice for the rulemaking has been changed to "Continued Storage of Spent Nuclear Fuel." Further, the title of the GEIS has been changed to, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel" to be consistent with the title of the rulemaking. Appendix D contains summaries of the public input received on the four specific questions on the proposed Rule and other comments received on the draft GEIS and proposed Rule as well as the NRC's responses to those comments.

ES.3 Why Has the NRC Developed a Generic Environmental Impact Statement?

Since the Waste Confidence Rule was originally developed in 1984, the NRC has periodically updated the Rule, with the last update completed in 2010. A number of parties challenged the 2010 Waste Confidence Rule in court, and in June 2012, the Court of Appeals for the District of Columbia Circuit ruled that the 2010 Waste Confidence rulemaking did not satisfy the NRC's NEPA obligations. The Court of Appeals identified deficiencies in the 2010 Waste Confidence rule related to the NRC's environmental analysis of spent fuel pool fires and leaks, and the environmental impacts should a repository not become available.

In response to the Court of Appeals' ruling, the Commission decided that the NRC would not issue any final licenses that relied upon the Waste Confidence Rule until the NRC addressed the deficiencies identified by the Court of Appeals (Commission Order CLI–12–16). The Commission separately directed the staff to develop an updated Waste Confidence decision and Rule supported by an environmental impact statement (SRM-COMSECY-12-0016). The staff has prepared this GEIS to satisfy its NEPA obligations regarding the environmental impacts of continued storage of spent fuel in an efficient manner. The GEIS provides a regulatory basis for the revision of the Rule. Chapter 1 of the GEIS provides a more detailed discussion of the history of the Waste Confidence rulemaking.

To comply with **The National Environmental Policy Act of 1969 (NEPA)** Federal agencies:

- assess the environmental impacts of major Federal actions,
- consider the environmental impacts in making decisions, and
- disclose the environmental impacts to the public.

ES.4 What is the Proposed Action Being Addressed in this GEIS?

The proposed Federal action is the adoption of a revised rule—10 CFR 51.23—that codifies the analysis in the GEIS of the environmental impacts of continued storage of spent fuel.

Why is the NRC evaluating continued storage on a generic basis?

The NRC considers the continued storage of spent fuel an activity that is similar for all commercial nuclear power plants and storage facilities. Therefore, a generic analysis is an appropriate, effective, and efficient method of evaluating the environmental impacts of continued storage. Other examples of NRC generic environmental evaluations include the License Renewal GEIS (NUREG–1437), the Decommissioning GEIS (NUREG–0586), and the In-Situ Leach Uranium Milling Facilities GEIS (NUREG–1910).

ES.5 What is the Purpose and Need for the Proposed Action?

The need for the proposed action is to provide processes for use in NRC licensing to address the environmental impacts of continued storage. Historically, the NRC and license applicants have relied on 10 CFR 51.23 to conclusively address the environmental impacts of continued storage in environmental reports, environmental impact statements (EISs), environmental assessments (EAs), and hearings. The purpose of the proposed action is to preserve the efficiency of the NRC's licensing processes with respect to the environmental impacts of continued storage.

ES.6 Could the NRC Pursue Options Other Than This Rulemaking?

Yes. As discussed in Section 1.6 of the GEIS, the NRC considered several different approaches for evaluating the environmental impacts of continued storage. The NRC looked at the three options that it could have pursued if it chose not to adopt a revised 10 CFR 51.23.

1. *The Site-Specific Review Option.* The NRC would take no action to generically address the environmental impacts of continued storage and, instead, would address the environmental impacts of continued storage in individual, site-specific licensing reviews.
2. *The GEIS-Only Option*. The NRC would rely on the GEIS to analyze the environmental impacts of continued storage, which would then support site-specific licensing reviews. There would be no Rule, so site-specific EISs or EAs would incorporate the GEIS by reference or adopt the conclusions in the GEIS.
3. *The Policy-Statement Option*. The Commission would issue a policy statement that expresses the Commission's intent to either adopt or incorporate the environmental impacts in the GEIS into site-specific NEPA actions or to prepare a site-specific evaluation for each NRC licensing action.

The NRC determined that the environmental impacts of these three options, in the case of no action, are essentially the same because they are merely different administrative approaches to addressing the environmental impacts of continued storage. Further, in both the proposed action and all of the NRC's options in the case of no action, the NRC would analyze the environmental impacts of continued storage. The NRC's conclusion is to adopt a revised 10 CFR 51.23 because of the efficiencies that would be gained in reactor and spent fuel storage facility licensing reviews. Adopting a revised Rule minimizes expenditures on site-specific reviews, limits the potential for lengthy project delays, and has the same environmental impacts as the NRC's options in case of no action.

During the scoping period and draft GEIS and proposed Rule comment period, the NRC received many suggested alternatives to the rulemaking, including calls for halting NRC licensing activities and shutting down operating reactors or imposing new requirements on nuclear power plants, such as storing spent fuel in special hardened onsite storage, reducing spent fuel pool density, and accelerating the transfer of spent fuel from pools to dry casks. The NRC determined that halting NRC licensing and closing nuclear reactors would not meet the purpose and need of the proposed action. The NRC also determined that additional requirements on spent fuel storage would not meet the purpose and need. Further, the GEIS is a NEPA review and does not authorize the initial or continued operation of any nuclear power plant, nor does it authorize storage of spent fuel; therefore, this GEIS would not be the appropriate activity in which to mandate new spent fuel storage requirements.

This rulemaking does not authorize the initial or continued operation of any nuclear power plant, nor does it authorize storage of spent fuel. It does not permit a nuclear power plant or any other facility to operate or store spent fuel. Every nuclear power plant or specifically licensed spent fuel storage facility must undergo an environmental review as part of its site-specific licensing process.

ES.7 What is Covered in the GEIS?

The GEIS analyzes the environmental impacts of continued storage of spent fuel. The NRC has looked at the direct, indirect, and cumulative effects of continued storage for three timeframes—short-term, long-term, and indefinite. These timeframes are defined below and are discussed in more detail in Section 1.8.2 of the GEIS. The analyses contained in this GEIS provide a regulatory basis for the proposed revisions to 10 CFR 51.23. Appendix B addresses the technical feasibility of repository availability and continued safe storage of spent fuel while Appendices E and F address the consequences of spent fuel pool leaks and fires, respectively.

ES.8 What is Not Covered in the GEIS?

The NRC is evaluating the continued storage of commercial spent fuel in this GEIS. Thus, certain topics are not addressed because they are not within the scope of this review. These topics include:

- noncommercial spent fuel (e.g., defense waste),
- commercial high-level waste generated from reprocessing,
- greater-than-class-C waste,
- foreign spent fuel stored in the United States,
- nonpower reactor spent fuel (e.g., test and research reactors, including foreign generated fuel stored in the United States),

- need for nuclear power, and
- reprocessing of commercial spent fuel.

ES.9 Did the NRC Involve the Public or Governmental Organizations?

The NRC announced that it was planning to develop an EIS and requested comments on the proposed scope of the GEIS in a *Federal Register* Notice that was published on October 25, 2012 (77 FR 65137). Publication of this notice began a 70-day public comment period for scoping. The NRC also issued press releases, sent scoping letters to Tribal governments and State liaisons, and sent e-mails to approximately 1,050 stakeholders who had previously expressed interest in matters related to high-level waste. The NRC conducted four public scoping meetings that were all accessible via Internet and telephone, so people from all over the country could participate and give their comments on the scope of the Waste Confidence GEIS. In November 2012, the NRC met with representatives of the U.S. Environmental Protection Agency (EPA) to discuss the Waste Confidence rulemaking. The NRC also held a government-to-government meeting with the Prairie Island Indian Community in June 2013. There are no formal cooperating agencies identified in this environmental review.

At the end of the 70-day scoping period, the NRC summarized what it heard and responded to public comments in its *Scoping Summary Report*, which can be accessed at http://pbadupws.nrc.gov/docs/ML1306/ML13060A128.pdf.

A separate document at http://pbadupws.nrc.gov/docs/ML1306/ML13060A130.pdf lists the scoping comments the NRC received, organized by category.

At the end of the draft GEIS and proposed Rule comment period, the NRC summarized the public comments and provided responses in Appendix D of this final GEIS.

A separate document at http://pbadupws.nrc.gov/docs/ML1415/ML14154A175.pdf lists the comments the NRC received on the draft GEIS and proposed Rule.

On September 13, 2013, the EPA published a notice of availability in the *Federal Register* (78 FR 56695), starting the 75-day comment period on the draft GEIS. In response to the October 2013 government shutdown, which caused the agency to reschedule several public meetings, the NRC extended the comment period to December 20, 2013 (78 FR 66858). The NRC also issued press releases, sent letters to Tribal governments and State liaison officers, produced a YouTube video, held multiple teleconferences, and sent e-mails to approximately 3,000 stakeholders who had expressed interest in this project. During the comment period the NRC held 13 public meetings throughout the United States. There were approximately 1,400 total participants at those meetings. Overall, the NRC received approximately

33,100 pieces of correspondence (e.g., e-mails, letters, postcards, etc.) from the public and recorded over 1,600 pages of transcripts.

GEIS Section 1.7 and Appendices A, C, and D discuss public and agency involvement in this environmental review and rulemaking. The Scoping Summary report provides information about the NRC's scoping activities and what the NRC heard during the scoping process. Appendix D provides the NRC's responses to comments received on the draft GEIS and proposed Rule as well as Agencywide Documents Access and Management System (ADAMS) accession numbers for public meeting summaries and transcripts.

The ADAMS electronic public reading room is available at http://www.nrc.gov/reading-rm/adams.html. If you encounter issues accessing ADAMS, call the NRC at 1-800-397-4209 or 301-415-4737, or send an e-mail to pdr.resource@nrc.gov.

ES.10 What Type of Comments Did the NRC Receive on the Draft GEIS?

The NRC transcribed approximately 1,600 pages of comments from nearly 500 meeting participants during the 13 public meetings and received approximately 33,100 written submittals during the comment period. The most common topics were general opposition to nuclear power, feasibility of safe storage and disposal, and alternatives. Other high-interest topics included spent fuel pool fires and leaks, institutional controls, high-burnup fuel, accidents, terrorism and security, expedited transfer of spent fuel to dry cask storage and hardened onsite storage of fuel, and general opposition to the Rule and GEIS. Detailed information on all correspondence, including authors and ADAMS accession numbers for submissions, is contained in a separate document titled, *Comments on the Waste Confidence Draft Generic Environmental Impact Statement and Proposed Rule*, which is located in ADAMS under Accession No. ML14154A175. Appendix D provides comment summaries and the NRC's responses to comments.

ES.11 What Were the Changes to the Final GEIS?

As stated earlier, the NRC received thousands of comments on the draft GEIS and proposed Rule. The NRC made changes to the final GEIS and proposed Rule to address some of the concerns raised in those comments. The NRC also added a glossary (Chapter 11). Some of the changes to the final GEIS are listed below.

High-Burnup Fuel. Because of interest from the public, the NRC added a new appendix (Appendix I) that provides background information on the licensing, storage, and transportation of high-burnup fuel.

Institutional Controls. Because of the volume of public comment on institutional controls, the NRC added additional information in Appendix B.

Purpose of GEIS, Proposed Federal Action, Purpose and Need, and Alternatives. In response to public comments regarding the structure of the GEIS and the rulemaking, the NRC has revised several sections of Chapter 1. The purpose of the GEIS (see Section 1.3) has been simplified to more clearly focus on determining the environmental impacts of continued storage and determining whether those impacts can be generically addressed. The proposed Federal action (in Section 1.4) is the adoption of a revised Rule that codifies, or adopts into regulation, the environmental impacts of continued storage. The purpose of the rulemaking (in Section 1.5) is to preserve the efficiency of NRC's licensing processes with respect to the environmental impacts of continued storage, and the need (also in Section 1.5) is to provide processes for use in NRC licensing to address the environmental impacts of continued storage. Because only the proposed action preserves the efficiency of the NRC's licensing processes with respect to the environmental impacts of continued storage, the NRC's alternatives analysis (in Section 1.6) focuses on the processes—or options—that the NRC could use in the case of no action. These options include all of the approaches to considering the impacts of continued storage that the NRC considered as alternatives in the draft GEIS. Finally, the NRC has clarified that the NRC's proposed action and its options in the case of no action are all different administrative approaches to addressing the environmental impacts of continued storage, and as such, their environmental impacts are not significant.

Cost-Benefit Analysis. The NRC updated its cost-benefit analysis so that it contains current—and reduced—costs for NRC staffing, as well as discounting that starts from a 2014 baseline instead of a 2013 baseline. All cost-benefit information is now presented in 2014 dollars. In addition, the cost-benefit analysis identifies costs associated with GEIS-development and rulemaking as past (or sunk) costs, but it retains them in the analysis to provide a complete picture of the costs associated with each activity. In addition, the NRC changed the arrangement of sections in Chapter 7 to reflect the revised approach to alternatives. Section 7.2 now contains the proposed action, while subsequent sections (Sections 7.3, 7.4, and 7.5) each contain NRC's options in the case of no action.

Cost of Continued Storage. Due to the large number of comments received on this topic the NRC added cost information for continued storage activities and facilities in Chapter 2.

Technical Feasibility of Safe Storage. Additional information was provided in Appendix B on the role of a regulatory framework and institutional controls during continued storage.

Substantive changes to the final GEIS are indicated by "change bars" in the margins of pages.

ES.12 How did the NRC Evaluate the Continued Storage of Spent Fuel in this GEIS?

The NRC looked at potential environmental impacts of continued storage in three timeframes: short-term storage, long-term storage, and indefinite storage (see Figure ES-1). The short-term and long-term storage timeframes include an assumption that a permanent geologic repository becomes available by the end of those timeframes. The indefinite storage timeframe assumes that a repository never becomes available. For a detailed discussion of the three timeframes, see Section 1.8.2.

The NRC has analyzed three timeframes that represent various scenarios for the length of continued storage that may be needed before spent fuel is sent to a repository. The first, most likely, timeframe is the short-term timeframe, which analyzes 60 years of continued storage after the end of a reactor's licensed life for operation. The NRC acknowledges, however, that the short-term timeframe, although the most likely, is not certain. Accordingly, the GEIS also analyzed two additional timeframes. The long-term timeframe considers the environmental impacts of continued storage for an additional 100 years after the short-term timeframe for a total of 160 years after the end of a reactor's licensed life for operation. Finally, although the NRC considers it highly unlikely, the GEIS includes an analysis of an indefinite timeframe, which assumes that a repository does not become available.

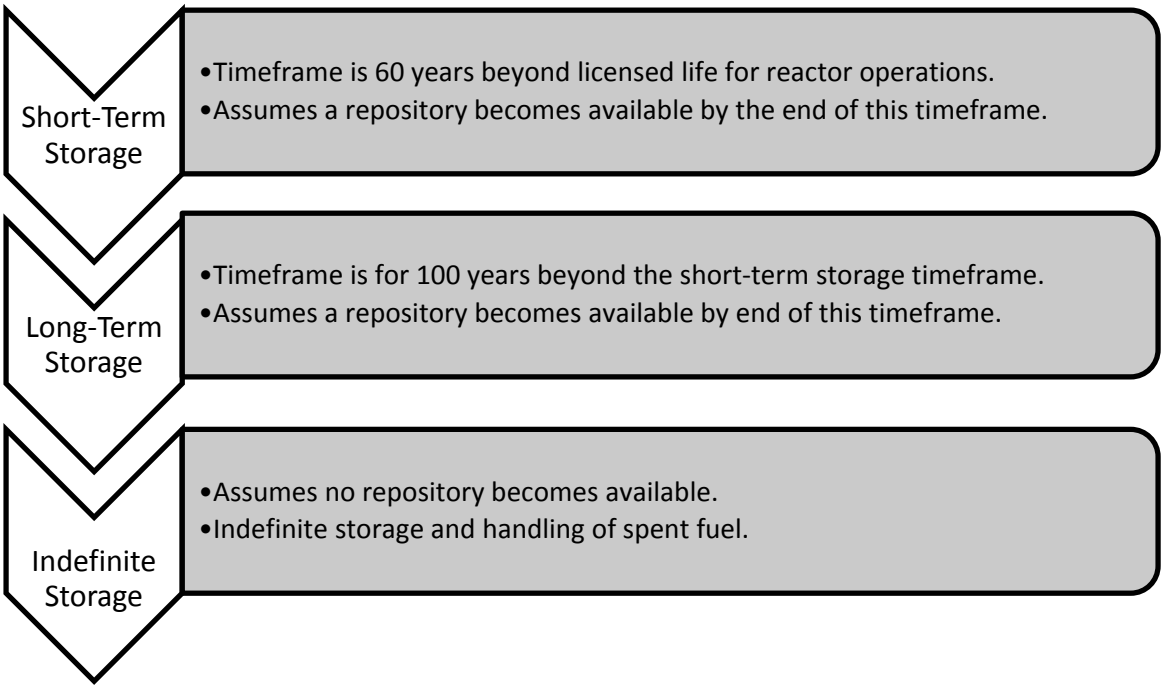


Figure ES-1. Three Storage Timeframes Addressed in this GEIS

To guide its analysis, the NRC also relied on certain assumptions regarding the storage of spent fuel. A detailed discussion of these assumptions is contained in Section 1.8.3. Some of these assumptions are listed below:

- Institutional controls would remain in place.
- Spent fuel canisters and casks would be replaced approximately once every 100 years.
- Independent spent fuel storage installation (ISFSI) and dry transfer system (DTS) facilities would also be replaced approximately once every 100 years.
- A DTS would be built at each ISFSI location for fuel repackaging.
- All spent fuel would be moved from spent fuel pools to dry storage by the end of the short-term storage timeframe (60 years).
- In accordance with NEPA, the analyses in the GEIS are based on current technology and regulations.

An ***ISFSI*** is a facility designed and constructed for the interim storage of spent fuel. Typically, spent fuel is stored in dry cask storage systems. NRC requirements state that dry cask storage must shield people and the environment from radiation and keep the spent fuel inside dry and nonreactive.

DTSs would be built at ISFSI sites (at-reactor or away-from-reactor) in the long-term storage timeframe. A DTS would enable retrieval of spent fuel for inspection or repackaging without the need to return the spent fuel to a spent fuel pool.

The NRC used previous environmental evaluations and technical reports to help inform the impact determinations in this GEIS. Chapter 1 includes a list of NEPA documents used in the development of the GEIS, and the end of each chapter includes a complete list of references. References are publicly available, and most are available in ADAMS.

ES.13 What Facilities and Activities are Addressed in the GEIS?

Chapter 2 describes typical facility characteristics and activities that the NRC used to assess the environmental impacts of continued storage of spent fuel. The GEIS looked at spent fuel storage at single- and multiple-reactor nuclear power plant sites, in spent fuel pools, at-reactor ISFSIs, and away-from-reactor ISFSIs. In addition to existing reactor designs and conventional spent fuel, the NRC also considered reactor and fuel technologies such as mixed oxide fuel (MOX) and small modular reactors.

Section 2.2 describes the activities related to the storage of spent fuel that are expected to occur during the three storage timeframes (short-term, long-term, and indefinite).

For the long-term storage timeframe, the NRC assumes that all spent fuel has already been moved from the spent fuel pool to dry cask storage by the end of the short-term storage timeframe. The spent fuel pool would be decommissioned within 60 years after permanent cessation of operation, as required by 10 CFR 50.82 or 10 CFR 52.110.

The third timeframe—*indefinite storage*—assumes that a geologic repository does not become available. In this timeframe, at-reactor and away-from-reactor ISFSIs would continue to store spent fuel in dry casks indefinitely. For the evaluation of environmental impacts if no repository becomes available, the following activities are considered:

- continued storage of spent fuel in ISFSIs, including routine maintenance,
- replacement of ISFSIs and spent fuel canisters and casks every 100 years,
- construction and operation of an away-from-reactor ISFSI (including replacement every 100 years), and
- construction and operation of a DTS (including replacement every 100 years).

These activities are the same as those that would occur for long-term storage, but without a repository, they would occur repeatedly.

1.8.3 Analysis Assumptions

To evaluate the potential environmental impacts of continued storage, this GEIS makes several assumptions.

- Although the NRC recognizes that the precise time spent fuel is stored in pools and dry cask storage systems will vary from one reactor to another, this GEIS makes a number of reasonable assumptions regarding the length of time the fuel can be stored in a spent fuel pool and in a dry cask before the fuel needs to be moved or the facility needs to be replaced. With respect to spent fuel pool storage, the NRC assumes that all spent fuel is removed from the spent fuel pool and placed in dry cask storage in an ISFSI no later than 60 years after the end of the reactor's licensed life for operation. With respect to dry cask storage, the NRC assumes that the licensee uses a DTS during long-term and indefinite storage timeframes to move the spent fuel to a new dry cask every 100 years. Similarly, the NRC assumes that the DTS and the ISFSI pad are replaced every 100 years. For an ISFSI that reaches 100 years of age near the end of the short-term storage timeframe, the NRC assumes that the replacement would occur during the long-term storage timeframe.
- Based on its knowledge of and experience with the structure and operation of the various facilities that will provide continued storage, including the normal life of those facilities, the NRC believes that spent fuel pool storage could last for about 60 years beyond the licensed life for operation of the reactor where it is stored, and that each ISFSI will last about 100 years.

As described in more detail in Section 2.2.1, nuclear power plant licensees will undertake major decommissioning activities during the 60 years following permanent cessation of reactor operations. During major decommissioning activities, the licensees will transfer spent fuel from spent fuel pools to either an at-reactor or away-from-reactor ISFSI. When decommissioning of the reactor and related facilities is completed and the at-reactor ISFSI is the only spent fuel storage structure left onsite, the facility is referred to as an "ISFSI-only site." Existing ISFSI-only sites include Big Rock Point, Haddam Neck, Fort St. Vrain, Maine Yankee, Rancho Seco, Trojan, and Yankee Rowe.

The NRC requires licensees to develop spent fuel management plans that include specific consideration of a plan for removal of spent fuel stored under a general license, and spent fuel management before decommissioning systems and components needed for moving, unloading, and shipping spent fuel (10 CFR 50.54(bb) and 72.218).[9]

Construction of a replacement at-reactor ISFSI is a continued storage activity in the long-term and indefinite timeframes. The Electric Power Research Institute (EPRI) developed a formula for estimating the cost to design, license, and construct a dry cask storage facility (EPRI 2012). EPRI's cost estimate is based in part on the number of casks at the facility. For cost estimates in this GEIS, the NRC uses the EPRI value of 10 MTU per cask (EPRI 2009), which translates to 160 casks for a 1,600 MTU at-reactor ISFSI. Based on EPRI's formula and its 2012 data, a single 1,600 MTU storage capacity facility costs $107,000,000 ($107M) to design, license, and construct.

Following the terrorist attacks on September 11, 2001, the NRC issued Orders to ISFSI licensees to require certain compensatory measures. For example, on May 23, 2002, the NRC issued an Order to the GEH Morris wet storage ISFSI (NRC 2002b). On October 16, 2002, the NRC also issued Orders to specifically licensed and generally licensed dry storage ISFSIs (including those with near-term plans to store spent fuel in an ISFSI under a general license). The details of these Orders are withheld from the public for security reasons.

In addition to NRC licensing requirements, licensees may also be subject to individual State requirements. For example, the State of Minnesota Public Utilities Commission requires an applicant to receive a "certificate of need" prior to constructing an ISFSI.

Example of At-Reactor ISFSIs

Dry cask storage systems in use in the United States are summarized in Appendix G. Two common systems are described below.

[9] The regulations reference "irradiated-fuel-management plans." For the purposes of this discussion there is no difference between irradiated fuel and spent fuel.

A common vertical dry cask storage system currently in use in at-reactor ISFSIs is Holtec International's HI-STORM 100. The HI-STORM cylindrical overpack is stored on an ISFSI pad with its longitudinal axis in a vertical orientation and could contain, for example, a single Holtec MPC-32 multipurpose canister, which can hold up to 32 PWR fuel assemblies. Compatible canisters are also available for BWR spent fuel. As a result, dry storage of the entire 1,600 MTU of spent fuel generated by a typical reactor, assuming all spent fuel is eventually transferred from the spent fuel pool, would require about 100 casks. Each storage cask is about 3.4 m (11 ft) wide and 6.1 m (20 ft) tall. The layout of casks on an ISFSI pad is guided by operational considerations at each site. However, a nominal layout involves casks separated by about 4.5 m (15 ft). Therefore, a typical ISFSI pad with 100 casks located inside a protected area common to the power plant, and arranged as 10 rows of 10 casks each, would cover about 46 × 46 m (150 × 150 ft) for a total area of about 0.2 ha (0.5 ac) (Holtec 2000). For purposes of analysis in this GEIS, the NRC assumes that an ISFSI of sufficient size to hold all spent fuel generated by a reactor is constructed during the reactor's licensed life for operation.

A common horizontal dry cask storage system currently in use in at-reactor ISFSIs is available from Transnuclear, Inc., a wholly-owned subsidiary of AREVA North America. The NUHOMS horizontal cask system uses dry shielded canisters that are placed in concrete horizontal storage modules (HSMs). Among the compatible NRC-approved canister designs is the NUHOMS-61BT dry shielded canister. This canister, for example, can hold 61 BWR fuel assemblies. Canisters are also available for PWR spent fuel. For a BWR, the HSM is about 6.0 m (20 ft) long, 4.6 m (15 ft) high and 2.9 m (9.7 ft) wide. As a result, dry storage of 1,600 MTU of spent fuel generated by a generic BWR, assuming all spent fuel is eventually transferred from the spent fuel pool to an at-reactor ISFSI, would require about 150 HSMs. If HSMs were installed in rows and placed back-to-back in 2 × 10 arrays, an ISFSI with 150 HSMs would require about 7 double module rows and a single module row of 10 HSMs. Allowing for a 6-m- (20-ft-) wide concrete approach slab on the entrance side of each HSM, a 150 HSM ISFSI site would be about 60 m (200 ft) wide and 220 m (720 ft) long. Therefore, the total area of the horizontal ISFSI, including the protected area, would be about 1.3 ha (3.6 ac).

2.1.3 Away-from-Reactor ISFSIs

Existing away-from-reactor ISFSIs include the GEH Morris wet storage facility in Morris, Illinois, and the DOE's Three Mile Island, Unit 2 Fuel Debris ISFSI at the Idaho National Engineering Laboratory. Further, the NRC has issued a license to PFS for an away-from-reactor ISFSI, which would have been located on the reservation of the Skull Valley Band of Goshute Indians (NRC 2004b).

A future away-from-reactor ISFSI could accept spent fuel from one or more nuclear power plants. For purposes of this GEIS, the NRC assumes that the nuclear power industry could develop an away-from-reactor ISFSI that would store up to 40,000 MTU of spent fuel from various nuclear power plant sites using existing technologies.

> ***Start-up costs*** *include the design, engineering, and licensing costs associated with constructing a storage facility.*
>
> ***Storage facility capital costs*** *include the construction, material, and equipment costs for the storage pads and the various support buildings.*
>
> ***Transportation capital costs*** *include infrastructure (e.g., rail spurs), transportation equipment (e.g., rail locomotives and cars), and transportation casks and associated equipment.*

Construction of away-from-reactor ISFSIs is a continued storage activity for the short-term, long-term, and indefinite timeframes. For an away-from-reactor ISFSI, the initial construction cost is different than subsequent replacement construction costs because of transportation. For spent fuel transportation, continued storage only addresses the one-time transfer of spent fuel from the at-reactor ISFSI to an away-from reactor ISFSI. Therefore, transportation capital costs are only included in the initial construction of an away-from-reactor ISFSI. For continued storage, subsequent replacement of an away-from-reactor ISFSI excludes transportation capital costs because the spent fuel is already located at the site. EPRI estimated the costs of constructing a 40,000 MTU ISFSI (EPRI 2009). The EPRI estimate is based in part on the number of casks at the facility. For cost estimates in this GEIS, the NRC uses the EPRI value of 10 MTU per cask (EPRI 2009) which translates to 4,000 casks for a 40,000 MTU away-from-reactor ISFSI. Based on 2009 data from EPRI (EPRI 2009), the NRC estimates initial construction costs for a 40,000 MTU away-from-reactor interim storage facility at $680M, which includes $74.2M for start-up costs, $141M for facility capital costs, and $465M for transportation capital costs. Excluding the transportation capital cost reduces the price for building a replacement away-from-reactor ISFSI at that location (i.e., subsequent replacement construction cost) to $215M. Activity costs associated with transportation are described in GEIS Section 2.2.1.4.

Spent fuel would be moved from operating or decommissioning reactor sites, or ISFSI-only sites, to an away-from-reactor ISFSI or ISFSIs, and then from the away-from-reactor ISFSI to one or more permanent repositories. Aside from the existing GEH Morris wet storage facility, and for the purposes of the analysis in this GEIS, the NRC assumes that, in the future, a portion of the nuclear power industry's spent fuel would be stored in one or more dry cask storage systems at an away-from-reactor ISFSI.

In 2006, the NRC granted a license to PFS, to construct and operate an away-from-reactor ISFSI in Skull Valley, Utah. PFS, a consortium of eight nuclear power utilities, proposed to construct the site on the reservation of the Skull Valley Band of Goshute Indians, about 80 km (50 mi) southwest of Salt Lake City, Utah. The PFS facility was intended for temporary aboveground storage, using the Holtec HI-STORM dual-purpose canister-based cask system, of up to 40,000 MTU of spent fuel from U.S. commercial nuclear power plants. PFS proposed to build the ISFSI on a 330-ha (820-ac) site leased from the Skull Valley Band of Goshute Indians. The site would be located in the northwest corner of the reservation approximately 6 km (3.5 mi)

from the Skull Valley Band's village. The proposed PFS ISFSI has not been constructed. Despite the PFS facility not having been constructed, issuance of the PFS license supports the assumption in this GEIS that an away-from-reactor ISFSI is feasible and that the NRC can license an away-from-reactor storage facility. Thus, the NRC's analysis of construction, operation, and decommissioning activities and impacts for an away-from-reactor ISFSI in NUREG–1714 are reflected in this GEIS (NRC 2001).

Consolidated Storage

On January 29, 2010, the President of the United States directed the Secretary of Energy to establish a "Blue Ribbon Commission on America's Nuclear Future." The Blue Ribbon Commission was tasked with conducting a comprehensive review of policies for managing the back end of the nuclear fuel cycle and recommending a new strategy. The Blue Ribbon Commission issued its findings and conclusions in January 2012 (BRC 2012). Among the findings and conclusions related to continued storage of spent fuel was a strategy for prompt efforts to develop one or more consolidated storage facilities.

In January 2013, DOE published its response to the Blue Ribbon Commission recommendations titled, *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste* (DOE 2013). This strategy implements a program over the next 10 years that, with congressional authorization, will:

- site, design, construct, license, and begin operation of a pilot interim storage facility by 2021 with an initial focus on accepting spent fuel from shutdown reactor sites,
- advance toward the siting and licensing of a larger interim storage facility to be available by 2025 with sufficient capacity to provide flexibility in the waste-management system and allow for acceptance of enough spent fuel to reduce expected government liabilities, and
- make demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048.

The Federal government's support for interim storage supports the NRC's decision to consider this type of facility as one of the reasonably foreseeable interim solutions for spent fuel storage pending ultimate disposal at a repository.

2.1.4 Dry Transfer System

Although there are no dry transfer systems (DTSs) at U.S. nuclear power plant sites today, the potential need for a DTS, or facility with equivalent capability, to enable retrieval of spent fuel from dry casks for inspection or repackaging will increase as the duration and quantity of fuel in dry storage increases. A DTS would enhance management of spent fuel inspection and repackaging at all ISFSI sites and provide additional flexibility at all dry storage sites by enabling

assumes that construction of a reference DTS would take 1 to 2 years. Section 2.1.4 discusses construction costs for a DTS. Operation costs for the DTS, described in Section 2.2.2.2, are associated with the labor to transfer spent fuel from old casks to new casks.

DOE has described the operation of a reference DTS in the *Dry Transfer System Topical Safety Analysis Report* (DOE 1996). A summary is provided here to illustrate the process of spent fuel repackaging.

The reference DTS includes three major areas:

- preparation area,
- lower access area, and
- transfer confinement area.

As shown in Figure 2-3, receiving casks and source casks enter the preparation area and exit the DTS on rail-mounted trolleys. To begin spent fuel transfer operations, a receiving cask (i.e., the cask into which fuel will be transferred) is transported to the DTS. The receiving cask is positioned and loaded on a receiving cask transfer trolley at the DTS and rolled into the preparation area. Next, the receiving cask lid and outer and inner canister lids are removed. Finally, the receiving cask is moved into the lower access area and mated to the transfer confinement area.

A source cask (i.e., the cask from which fuel will be transferred) follows a similar path as the receiving cask into the lower access area and is mated to the transfer confinement area. No personnel are present in the lower access area for the transfer operations; all transfer operations are controlled remotely. The lids on both the receiving cask and source cask are removed to prepare for spent fuel transfer. The fuel-assembly-handling subsystem in the transfer confinement area is used to grab and lift a spent fuel assembly from the source cask. The spent fuel assembly is lifted inside a transfer tube and then moved over an empty position in the receiving cask. The spent fuel assembly is lowered into the receiving cask and detached from the lifting device. When spent fuel transfers are complete, both casks are closed, detached from the transfer confinement area, and ultimately removed from the lower access area back to the preparation area.

Maintenance and monitoring activities at the DTS would include routine inspections and testing of the spent fuel and cask transfer and handling equipment (e.g., lift platforms and associated mechanical equipment) and process and effluent radiation monitoring.

Damaged Fuel

As stated in Section 2.1.4, one reason DTSs may be needed in the future is to reduce risks associated with unplanned events (e.g., the need to repackage spent fuel that becomes

damaged or that becomes susceptible to damage while in dry cask storage). The NRC defines damaged spent fuel as any fuel rod or fuel assembly that can no longer fulfill its fuel-specific or system-related functions (NRC 2007). These functions include criticality safety, radiation shielding, confinement, and retrievability of the fuel. Appendix B of this GEIS describes spent fuel degradation mechanisms that could occur during continued storage. These include a mechanism (i.e., hydride reorientation) in which high-burnup spent fuel cladding can become less ductile (more brittle) over time as cladding temperatures decrease. Taking actions (e.g., repackaging or providing supplemental structural support) can reduce risks posed by damaged fuel by maintaining fuel-specific or system-related safety functions.

The Transnuclear-EPRI DTS described by DOE in its topical safety analysis report (DOE 1996) and summarized in Section 2.1.4 of this GEIS does not have the capability to handle damaged spent fuel, which the DOE defined as spent fuel that is not dimensionally or structurally sound and spent fuel that cannot be handled by normal means. However, as a result of its experience with damaged spent fuel, described in more detail in the following paragraphs, the nuclear power industry has developed specialized tools that could be deployed if damaged spent fuel needs to be retrieved from a dry cask storage system. Therefore, NRC considers it reasonable to assume that a DTS similar to the Transnuclear-EPRI DTS could be designed, constructed, and equipped to handle damaged fuel.

International experience provides a broad understanding of the technical feasibility of various methods for handling damaged fuel. An International Atomic Energy Agency (IAEA 2009) technical report documented the types of methods that have been used separately or in combination to handle damaged spent fuel under a variety of circumstances while maintaining specific safety functions. The methods include removinging rods, canning, replacing or repairing damaged structural components, and providing supplemental structural support. When a single rod in a fuel assembly is damaged, the damaged rod can be removed to restore the integrity of the fuel assembly, but that process leaves a gap in the fuel assembly. Rod replacement involves replacing the damaged rod with a steel rod to maintain the structural integrity of the assembly to facilitate transfer. Structural repair or replacement involves repairing or replacing damaged components in the assembly (e.g., grid spacers, vanes, and tie plates) to restore stability of the assembly. Supplemental structural support involves adding mechanical strengthening to the assembly to address loss of capabilities from a damaged part.

The NRC requires that spent fuel classified as damaged for storage be protected during storage (e.g., placed in a can designed for damaged fuel, referred to as a damaged fuel can or damaged fuel container (NRC 2007).[12] A damaged fuel can is designed to ensure that the fuel-specific or system-related functions continue to be met. When a spent fuel assembly is placed

[12] An acceptable alternative approved by the NRC is to confine damaged spent fuel using top and bottom “end caps” in dry cask storage system basket cells (Transnuclear, Inc. 2011).