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PG&E Letter DIL-15-026

ATTN: Document Control Desk
Director, Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

10 CFR 72.30

Docket No. 72-26, Materials License No. SNM-2511
Diablo Canyon Independent Spent Fuel Storage Installation
Decommissioning Funding Plan

Dear Commissioners and Staff:

On June 17, 2011, the NRC issued a Decommissioning Planning Rule in the Federal Register (76 FR 35512), to become effective December 17, 2012. Pacific Gas and Electric Company's (PG&E's) response to the new requirements in 10 CFR 72.30, "Financial assurance and recordkeeping for decommissioning," for a decommissioning funding plan (DFP) is contained in this letter and enclosures. PG&E is submitting this DFP for NRC review and approval in accordance with 10 CFR 72.30(b).

DFP requirements in 10 CFR 72.30(c) include addressing four specific events. PG&E's response to these four events is included in Enclosure 1 to this letter.

Enclosure 2 to this letter contains the cost estimate details that support the total Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI) decommissioning cost estimate, and also includes the funding assumptions used to determine the Diablo Canyon ISFSI decommissioning costs. Enclosure 2 and the information contained in this letter address the requirements in 10 CFR 72.30(b).

On December 21, 2001, PG&E submitted a license application to construct and operate the Diablo Canyon ISFSI. The license application included a Preliminary Decommissioning Plan, as required by 10 CFR 72.30, that included a DFP that met the requirements of 10 CFR 72.30(c) at that time. The DFP stated that PG&E had established external sinking fund accounts for decommissioning Diablo Canyon Power Plant as well as the Diablo Canyon ISFSI. Assurance of funds was reported in an annual decommissioning funding report dated March 27, 2003, in accordance with 10 CFR 50.75(f). Financial assurance for decommissioning the Diablo Canyon ISFSI is provided by an external sinking fund in accordance with

10 CFR 50.75(e)(1)(ii). NRC letter, "Issuance of Materials License No. SNM-2511 for the Diablo Canyon Independent Spent Fuel Storage Installation (TAC NO. L23399)," dated March 22, 2004, included a Safety Evaluation Report (SER) as Enclosure 2. Section 13.2, "Evaluation Findings," of this SER concluded the following:

- PG&E has adequately demonstrated its financial qualifications to construct, operate and decommission the proposed ISFSI, in accordance with 10 CFR 72.22(e).
- The decommissioning plan submitted by PG&E provides reasonable assurance that the decontamination and decommissioning of the ISFSI at the end of its useful life will provide adequate protection to the health and safety of the public and the proposed decommissioning plan complies with 10 CFR 72.24(q), 72.30(a) and 72.130.
- The DFP submitted by PG&E is sufficient to provide reasonable assurance that costs related to decommissioning as characterized by the proposed decommissioning plan have been adequately estimated and the cost estimate in the DFP complies with 10 CFR 72.30(b).
- The financial assurance mechanisms submitted by PG&E are sufficient to provide reasonable assurance that adequate funds will be available to decommission the ISFSI so that the site will ultimately be available for unrestricted use for any private or public purpose and the financial assurance mechanisms in the DFP comply with 10 CFR 72.30(c).

Therefore, PG&E concludes that there is reasonable assurance, as required by 10 CFR 72.30(b), that funds will be available to decommission the Diablo Canyon ISFSI.

PG&E makes no new or revised regulatory commitments (as defined by NEI 99-04) in this letter.

If you have any questions in regard to this document, please contact Mr. Lawrence Pulley at (805) 545-6165.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 17, 2015.

Sincerely,



Edward D. Halpin
Senior Vice President – Power Generation and Chief Nuclear Officer

BNSM/4540/64109612

Enclosures

cc: Diablo Distribution
Marc L. Dapas, Regional Administrator, NRC Region IV
John M. Goshen, P.E., NMSS Project Manager
Siva P. Lingam, NRC Project Manager
Gonzalo L. Perez, California Department of Public Health
John Reynoso, Acting NRC Senior Resident Inspector

PG&E'S RESPONSE TO THE FOUR EVENTS IN 10 CFR 72.30(c)

The four events in 10 CFR 72.30(c) are identified below, as well as Pacific Gas and Electric Company's (PG&E's) response to each event.

The decommissioning funding plan must specifically consider the effect of the following events on decommissioning costs:

- (1) *Spills of radioactive material producing additional residual radioactivity in onsite subsurface material.*

PG&E Response: There have not been any spills of radioactive material in the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI) storage site and cask transfer facility (CTF).

Spills of radioactive material in the Diablo Canyon ISFSI storage site and CTF are not expected to occur because radioactive material that could spill will not be brought into the ISFSI area, and because of the ISFSI design and administrative control features described in the ISFSI Updated Final Safety Analysis Report, Section 7.3.1. Specifically:

- There are no radioactive systems at the ISFSI storage pads other than the overpacks containing multi-purpose canisters (MPCs).
- The fuel is stored dry inside the MPC, so that no radioactive liquid is available for leakage.
- The MPCs are loaded, welded, and the upper lid decontaminated in the Diablo Canyon Power Plant fuel handling building (FHB)/auxiliary building (AB) before being moved to the CTF located near the ISFSI storage pads.
- The overpacks are loaded and the lids installed prior to movement from the CTF to the ISFSI pads.
- Fuel is not removed from the MPCs at either the ISFSI storage pads or the CTF. Unloading of the fuel from the MPC, if necessary, would only occur in the SFP in the FHB/AB.

In the NRC Safety Evaluation Report (SER) dated March 22, 2004, Section 13.1.2.1, the NRC concurred with PG&E's assessment that the Diablo Canyon ISFSI storage system will "minimize contamination and facilitate decommissioning." The SER states, "The zero-leakage design of the MPCs...and the passive cooling design of the storage system, minimize the potential for radioactive contamination to occur and to spread."

(2) *Facility modifications.*

PG&E Response: There have been no modifications to the Diablo Canyon ISFSI design that could impact decommissioning costs, and no modifications are expected in the future that would increase decommissioning costs.

(3) *Changes in authorized possession limits.*

PG&E Response: The Diablo Canyon ISFSI design consists of 7 storage pads containing space for 20 fuel storage casks each. The quantity of fuel to fill these casks is the authorized limit as defined in Materials License No. SNM-2511, namely 2100 metric tons of uranium of intact spent fuel assemblies, damaged fuel assemblies and fuel debris. No changes to this limit are planned during the plant operating period. During the plant decommissioning period, a license amendment to incorporate storage of Greater Than Class C waste is expected. This change would not add any material that would increase radiological decommissioning costs.

(4) *Actual remediation costs that exceed the previous cost estimate.*

PG&E Response: PG&E will not begin to decommission the Diablo Canyon ISFSI until after the U.S. Department of Energy takes possession of the spent fuel. Currently this is estimated to begin no earlier than 2024. Therefore, there have been no actual remediation costs that exceed previous cost estimates.

The California Public Utilities Commission (CPUC) requires PG&E to update the ISFSI decommissioning cost estimate every three years. If a revised cost estimate exceeds a previous cost estimate, PG&E will submit a request to the CPUC requesting approval of increased funding based on a justifiable reason.

10 CFR 72.30 DIABLO CANYON POWER PLANT INDEPENDENT SPENT FUEL
STORAGE INSTALLATION DECOMMISSIONING COST ESTIMATE

10 CFR 72.30 Diablo Canyon Power Plant Independent Spent Fuel Storage Installation Decommissioning Cost Estimate

1. Background and Introduction

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011,^[1] with the rule becoming effective on December 17, 2012. Subpart 72.30, "Financial assurance and recordkeeping for decommissioning," requires that each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan that contains information on how reasonable assurance will be provided that funds will be available to decommission the Independent Spent Fuel Storage Installation (ISFSI).

In accordance with the rule, this letter provides a detailed cost estimate for decommissioning the ISFSI at Diablo Canyon Power Plant (DCPP) in an amount reflecting:

1. The work is performed by an independent contractor;
2. An adequate contingency factor; and
3. Release of the facility and dry storage systems for unrestricted use, as specified in 10 CFR Part 20.1402

This letter also provides:

1. Identification of the key assumptions contained in the cost estimate; and
2. The volume of onsite subsurface material containing residual radioactivity, if any, that will require remediation to meet the criteria for license termination, and

2. Spent Fuel Management Strategy

The operating license for DCPP Units 1 and 2 are currently set to expire on November 2, 2024, and August 26, 2025, respectively. Approximately 4,416 spent fuel assemblies are currently projected to be generated as a result of plant operations through these license expiration dates. The ISFSI is operated under a Part 72 Site Specific License.

¹ U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70 and 72 "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, Number 117 (p 35512 et seq.), June 17, 2011

Assuming that the plant operates to the end of currently licensed life the spent fuel pools are expected to contain up to 2,272 spent fuel assemblies after the final core offloads. To facilitate immediate dismantling or safe-storage operations, the spent fuel that cannot be transferred directly to the Department of Energy (DOE) from the pool is assumed to be packaged in dry storage casks for interim storage at the ISFSI. Transferring the spent fuel from the pool to the ISFSI will permit decontamination and dismantling of the spent fuel pool systems and fuel pool areas or result in reduced operating expenses should the station be placed into a SAFSTOR dormancy configuration.

Completion of the ISFSI decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site. DOE's repository program assumes that spent fuel allocations will be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.^[2] Pacific Gas and Electric's (PG&E's) current spent fuel management plan for the DCPD spent fuel is based in general upon: 1) a 2024 start date for DOE initiating transfer of commercial spent fuel to a federal facility, and 2) completion of spent fuel receipt by year 2055.^[3] The completion date is based upon the DOE's generator allocation/receipt schedules which are based upon the oldest fuel receiving the highest priority. Assuming a maximum rate of transfer of 3,000 metric tons of uranium/year,^[4] the spent fuel is projected to be removed from the DCPD site in 2055.

3. ISFSI Decommissioning Strategy

At the conclusion of the spent fuel transfer process the ISFSI will be promptly decommissioned (similar to the power reactor DECON alternative) by removing and disposing of residual radioactivity and verifying that remaining materials satisfy NRC release criteria.

For purposes of providing an estimate for a funding plan, financial assurance is expected to be provided on the basis of a prompt ISFSI decommissioning scenario. In this estimate the ISFSI decommissioning is considered an independent project, regardless of the decommissioning alternative identified for the nuclear power plant.

² U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) ... DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance, except as ..."

³ PG&E Letter DCL-15-044 dated March 31, 2015, Decommissioning Funding Report for Diablo Canyon Power Plant, Units 1 and 2

⁴ "Acceptance Priority Ranking & Annual Capacity Report," DOE/RW-0567, July 2004.

4. ISFSI Description

The DCPD ISFSI is a Holtec International (Holtec) HI-STORM 100 System. The HI-STORM 100 System is comprised of a multi-purpose canister (MPC), the HI-STORM 100SA storage overpack, and the HI-TRAC transfer cask. The MPCs are assumed to be transferred directly to the DOE and not returned to the station. The remaining overpacks are assumed to have residual radioactivity due to some minor level of neutron-induced activation as a result of the long-term storage of the spent fuel. The cost to dispose of residual radioactivity, and verify that the remaining facility and surrounding environs meet the NRC's radiological limits established for unrestricted use, form the basis of the ISFSI decommissioning estimate.

PG&E's current spent fuel management plan for the DCPD spent fuel would result in up to 138 spent fuel storage casks (nominal 32 assemblies per cask) being placed on storage pads at the site after all spent fuel has been removed from the spent fuel pools. This represents 100 percent of the total spent fuel projected to be generated during the currently licensed operating period.

In addition to the spent fuel casks located on the ISFSI pad after shutdown there are projected to be additional casks that are expected to be used for Greater-than-Class-C (GTCC) storage. The storage overpacks used for the GTCC canisters (estimated quantity of 10) are not expected to have any interior contamination or residual activation and can be reused or disposed of by conventional means after a final status survey. It should be noted that the present ISFSI is not sized nor licensed for GTCC. A new amendment would need to be submitted for constructing an additional storage pad space as well as adding GTCC as approved stored contents.

Table 1 provides the significant quantities and physical dimensions used as the basis in developing the ISFSI decommissioning estimate.

5. Key Assumptions / Estimating Approach

The decommissioning estimate is based on the configuration of the ISFSI expected after all spent fuel and GTCC material has been removed from the site. The configuration of the ISFSI is based on the Units 1 and 2 operating until the end of their current licenses, November 2, 2024, and August 26, 2025, respectively, and the assumptions associated with DOE's spent fuel acceptance, as previously described.

The nominal size of the ISFSI pad is sufficient to store the projected amount of spent fuel and is expected to be approximately 105 feet in width, and 500 feet in length.

It is not expected that the overpacks will have any interior or exterior radioactive surface contamination. It is expected that this assumption would be confirmed as a result of good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. Any neutron activation of the steel and concrete is expected to be extremely small. This is addressed in the Holtec Final Safety Analysis Report supporting general license 72-1014. To validate this assumption, the estimate accounts for characterization of 10 percent of the overpacks; it is likely that some of this characterization will take place well before the last of the fuel is removed from the ISFSI in order to establish a more definitive decommissioning scope.

The decommissioning estimate is based on the premise that some of the inner steel-liners of the concrete overpacks will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. As an allowance, 14 of the 138 overpack liners are assumed to be affected, i.e., contain residual radioactivity. The allowance quantity is based upon the number of casks required for the final core off-load (i.e., 193 offloaded assemblies (per reactor), 32 assemblies per cask, 2 reactors) which results in a total of 14 overpacks that contain residual radioactivity.

It is not expected that there will be any residual contamination left on the concrete ISFSI pad or in the cask transfer facility area. It is expected that this assumption would be confirmed as a result of good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. Therefore, it is assumed for this analysis that the ISFSI pad and transfer facility area will not be contaminated. As such, only verification surveys are included for the pad in the decommissioning estimate.

There is no known subsurface material in the proximity of the ISFSI containing residual radioactivity that will require remediation to meet the criteria for license termination.

To support an application for License Termination, the estimate assumes that a Final Status Survey will be performed; this will include a 100 percent survey of the concrete overpack surfaces, and a significant fraction of the ISFSI pad and the immediate area surrounding the pad.

Decommissioning is assumed to be performed by an independent contractor. As such, essentially all labor, equipment, and material costs are based on national averages, i.e., costs from national publications such as R.S. Means' Building Construction Cost Data (adjusted for regional variations), and laboratory service costs are based on vendor price lists. Those craft labor positions that are expected to be provided locally, are consistent with fully burdened contractor labor rates used in the most recently developed DCPD decommissioning cost

estimate, escalated to 2015 dollars. PG&E, as licensee, will oversee the site activities; the estimate includes PG&E's labor and overhead costs.

Low-level radioactive waste packaging, transport and disposal costs are based on rates consistent with the most recently developed decommissioning cost estimate (year 2011 dollars), escalated to 2015 dollars.

Costs are reported in 2015 dollars.

Contingency has been added at an overall rate of 25 percent. This is consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757.^[5]

The estimate is limited to costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use. Disposition of released material and structures is outside the scope of the estimate.

6. Cost Estimate

The estimated cost to decommission the ISFSI and release the facility for unrestricted use is provided in Table 2. The cost has been organized into three phases, including:

- An initial planning phase - empty overpacks are characterized and the specifications and work procedures for the decontamination (liner removal) developed.
- The remediation phase - residual radioactivity is removed, packaged in certified waste containers, transported to the low-level waste site, and disposed of at low-level waste.
- The final phase - license termination surveys, independent surveys are completed, and an application for license termination submitted.

In addition to the direct costs associated with a contractor providing the decommissioning services, the estimate also contains costs for the NRC (and NRC contractor), PG&E's oversight staff, site security (industrial), and other site operating costs.

For estimating purposes it should be conservatively assumed that all expenditures will be incurred in the year 2056, the year following all spent fuel removal.

⁵ "Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Volume 3, Revision 1, September 2003

**Table 1
 Significant Quantities and Physical Dimensions**

ISFSI Pad

Item	Length (ft)	Width (ft)	Residual Radioactivity
ISFSI Pad	500	105	No

ISFSI Overpack

Item	Value	Notes (all dimensions are nominal and rounded up)
Overall Height (inches)	229.5	
Outside Diameter (inches)	132.5	Main cylindrical body of overpack
Inside Diameter (inches)	73.5	
Inner Liner Thickness (inches)	1	
Quantity (total)	148	Spent Fuel (138) GTCC (10)
Quantity (with residual radioactivity)	14	Equivalent to the number of overpacks used to store last complete core offloads (7 each reactor)
Total Surface Area of Overpack Inner Liner with Residual Radioactivity (square feet)	5,300	
Low-Level Radioactive Waste (cubic feet)	2,554	
Low-Level Radioactive Waste (packaged density)	85	

Other Potentially Impacted Items

Item	Value	Notes
Number of Overpacks used for GTCC storage	10	No residual radioactivity

Table 2
ISFSI Decommissioning Costs¹ and Waste Volumes

	(thousands, 2015 dollars)						Waste Volume (ft3)	Person-Hours		
	Removal	Packaging	Transport	Disposal	Other	Total		Contractor	Licensee	NRC / NRC Contractor
Decommissioning Contractor										
Planning (characterization, specifications and procedures)	-	-	-	-	430.3	430.3	-	1,264	-	-
Remediation (activated liner removal)	272.7	12.8	33.7	965.4	56.8	1,341.5	2,554.0	852	-	-
License Termination (radiological surveys)	-	-	-	-	1,931.1	1,931.1	-	15,207	-	-
Subtotal	272.7	12.8	33.7	965.4	2,418.2	3,702.9	2,554.0	17,323	-	-
Supporting Costs										
NRC and NRC Contractor Fees and Costs	-	-	-	-	204.8	204.8		-	-	776
Insurance	-	-	-	-	160.1	160.1		-	-	-
Property Taxes	-	-	-	-	146.6	146.6		-	-	-
Security (industrial)	-	-	-	-	166.1	166.1		4,741	-	-
PG&E Oversight Staff	-	-	-	-	444.8	444.8		-	4,741	-
Subtotal	-	-	-	-	1,122.4	1,122.4	-	4,741	4,741	776
Total (w/o contingency)	272.7	12.8	33.7	965.4	3,540.6	4,825.3	2,554.0	22,064	4,741	776
Total (w/25% contingency)						6,031.6				

Note 1: For funding planning purposes decommissioning costs can be assumed to be incurred in year 2056.

Note 2: Columns may not add due to rounding