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PG&E Letter DIL-18-019

ATTN: Document Control Desk
Director, Division of Spent Fuel Management
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:

Pursuant to 10 CFR 72.30(b), each holder of a license under Part 72 must submit for NRC review and approval a decommissioning funding plan (DFP) containing information on how reasonable assurance will be provided that funds will be available to decommission its independent spent fuel storage installation (ISFSI). 10 CFR 72.30(c) further requires an updated DFP be submitted for NRC review and approval at the time of license renewal and at intervals not to exceed three years.

PG&E Letter DIL-12-011, "Decommissioning Funding Plan," dated December 17, 2012 (ML12353A315), and PG&E Letter DIL-15-026, "Decommissioning Funding Plan," dated December 17, 2015 (ML15351A502), submitted DFPs for NRC review and approval. By NRC Letter, "Nuclear Regulatory Commission's Analysis of Pacific Gas and Electric Company's Initial Decommissioning Funding Plan and Updated Decommissioning Funding Plan for Diablo Canyon's Independent Spent Fuel Storage Installation," dated November 19, 2018 (ML18324A594), the NRC issued its findings on the review of the 2012 and 2015 Diablo Canyon ISFSI DFPs. The NRC staff concluded that the initial and updated DFPs contained the information required by 10 CFR 72.30(b) and (c) and PG&E provided reasonable assurance that funds will be available to decommission the Diablo Canyon ISFSI.

PG&E hereby submits an updated DFP for NRC review and approval in accordance with 10 CFR 72.30(b) and (c).

Enclosure 1 contains PG&E's consideration of the four specific events as required by 10 CFR 72.30(c).



Enclosure 2 contains the cost estimate details that support the total Diablo Canyon ISFSI decommissioning cost estimate and funding assumptions in accordance with 10 CFR 72.30(b).

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. Richard Hagler at (805) 545-3891.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 17, 2018.

Sincerely,

James M. Welsch
Vice President Nuclear Generation and Chief Nuclear Officer

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Enclosures

cc: Diablo Distribution
William C. Allen, NMSS Project Manager
Kriss M. Kennedy, Regional Administrator, NRC Region IV
Christopher Newport, NRC Senior Resident Inspector
Gonzalo L. Perez, California Department of Public Health
Balwant Singal, NRC Senior Project Manager

10 CFR 72.30(c) Considerations

PG&E's consideration of certain events on decommissioning costs in accordance with 10 CFR 72.30(c) is as follows.

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 spent fuel pool 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. However, to support the plan for plant decommissioning, in addition to the spent fuel casks located on the ISFSI pad after shutdown, additional casks are expected to be used for greater-than-Class-C (GTCC) waste storage. The present ISFSI was not sized for both spent fuel and GTCC waste casks when licensed. Remedies include an additional partial storage pad or changes made to the current storage system that will be subject to updated licensing with the NRC. Such changes could affect 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. To support the plant decommissioning period, a license amendment to incorporate storage of GTCC 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 and GTCC waste. Currently this is estimated to begin no earlier than 2038. Therefore, there have been no actual remediation costs that exceed previous cost estimates. PG&E currently shows complete decommissioning of the ISFSI by 2071 as part of its recent submittal of the Decommissioning Cost Estimate for the 2018 Nuclear Decommissioning Cost Triennial Proceeding before the California Public Utilities Commission (CPUC).

The 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.

Enclosure 2
PG&E Letter DIL-18-019

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

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

1. Background and Introduction

The 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 Diablo Canyon ISFSI 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.

2. Spent Fuel Management Strategy

The operating licenses for Diablo Canyon Power Plant (DCPP) Units 1 and 2 are currently set to expire on November 2, 2024, and August 26, 2025, respectively. Approximately 4,398 spent fuel assemblies are 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.

Assuming that the plant operates to the end of currently licensed life, the spent fuel pools are expected to contain up to 2,542 spent fuel assemblies after the final core offloads (1,261 and 1,281 spent fuel assemblies stored in the Unit 1

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

and 2 spent fuel pools, respectively). To facilitate immediate dismantling, the spent fuel that cannot be transferred directly to the Department of Energy (DOE) from the pools is assumed to be packaged in dry storage casks for interim storage at the ISFSI. Transferring the spent fuel from the pools to the ISFSI will permit decontamination and dismantling of the spent fuel pool systems and fuel pool areas.

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 2038 start date for DOE initiating transfer of commercial spent fuel to a federal facility, and (2) completion of spent fuel and greater-than-Class-C (GTCC) waste receipt by year 2067.^[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. In accordance with the 10 CFR 961 standard contract,^[4] PG&E will be able to load a maximum of 5 full multi-purpose canisters (MPCs) into 5 DOE-supplied transportation casks each year. Thus, the spent fuel and GTCC waste is projected to be removed from Diablo Canyon in 2067.

3. ISFSI Decommissioning Strategy

At the conclusion of the spent fuel transfer process to DOE, 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 based on 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.

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- 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 "Application of Pacific Gas and Electric Company in the 2018 Nuclear Decommissioning Cost Triennial Proceeding." Pacific Gas and Electric Company filed with the California Public Utilities Commission on December 13, 2018.
- ⁴ "Acceptance Priority Ranking & Annual Capacity Report," DOE/RW-0567, July 2004.

4. ISFSI Description

The Diablo Canyon ISFSI uses a Holtec International (Holtec) HI-STORM 100 System. The HI-STORM 100 System is comprised of a 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 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 DCCP 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 GTCC waste storage. The storage overpacks used for the GTCC waste 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 waste. A new amendment would need to be submitted for constructing an additional storage pad space that accommodates GTCC waste as approved stored contents. PG&E may elect to implement a different storage system that will work within the existing ISFSI footprint.

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 current size of the ISFSI pad is sufficient to store the projected amount of spent fuel and is approximately 105 feet in width, and 476 feet in length. If a new partial pad is added to accommodate GTCC waste, the total ISFSI pad dimensions are expected to be approximately 105 feet in width and 510 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 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.

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.

However, the site-specific detailed cost estimate assumes radiological remediation of surficial soil in a limited area of approximately 1.2 acres (containing approximately 500 cubic yards) adjacent to the footprint of the ISFSI pad (i.e., expanded pad footprint that will include storage of the GTCC waste). Impacts to soil beneath the ISFSI pad are not anticipated given the limited pathways for contamination from the canisters, as well as the 7-foot thick concrete base of the pad.

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.

As per 10 CFR 72.30(b)(2)(i), 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 site-specific DCCP decommissioning cost estimate in 2017 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 site-specific decommissioning cost estimate in 2017 dollars.

Costs are reported in 2017 dollars.

An overall contingency of 19.1 percent has been added. This is less than the contingency referenced by the NRC in NUREG-1757 because the DCPD decommissioning cost estimate is site-specific.^[5]

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 4 major scopes of work, including:

- Utilities and Structures Demolition – includes planning, decontamination (as needed), and removal of site ISFSI pad and associated features
- Soil Remediation – remediate residual radiologically contaminated soil to meet radiological cleanup criteria
- Final Site Survey – license termination surveys, independent surveys, and application for license termination
- Waste, Transportation, and Material Management – waste handling, packaging, transportation, and disposal fees

In addition to the direct costs associated with decontamination, demolition and restoration, the estimate also contains costs for PG&E's oversight staff, security, site operating costs, and the NRC (and NRC contractor).

For estimating purposes, it should be assumed that all planning will occur between 2063-2067 and execution will occur between 2068-2071.

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	510	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)

Other Potentially Impacted Items

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

Table 2
ISFSI Decommissioning Costs and Waste Volumes

Scope	(thousands, 2017 \$)							(ft ³)	hours
	Labor	Material	Equipment	Transport	Disposal	Other	Total	Waste Volume	Labor Quantity
ISFSI Demolition and Site Restoration									
Utilities and Structures Demo	\$9,345	\$713	\$2,210			\$2,273	\$14,541		98,001
Soil Remediation	\$1,347	\$47	\$206			\$180	\$1,780		12,324
Final Site Survey	\$1,073					\$400	\$1,473		9,040
Waste, Transportation, & Material Management	\$11,613	\$789	\$967	\$1,434	\$2,376	\$688	\$17,867	234,407*	104,153
Support Costs									
Staffing	\$5,860					\$212	\$6,073		42,782
Insurance						\$1,001	\$1,001		
Property Tax						\$2,902	\$2,902		
NRC Fees / Reviews	\$209					\$1,661	\$1,871		797
Facility Maintenance	\$100						\$100		1,530
Water Management	\$101		\$440			\$25	\$566		2,702
Permits	\$258					\$2,013	\$2,271		1,881
License Termination Plan	\$2,957	\$139				\$50	\$3,146		18,630
Consumables		\$45				\$20	\$65		
Security		\$159					\$159		
Total (w/o contingency)	\$32,863	\$1,893	\$3,823	\$1,434	\$2,376	\$11,425	\$53,813	234,407	291,841
Contingency	\$6,310	\$374	\$794	\$215	\$832	\$1,730	\$10,255		
Grand Total	\$39,173	\$2,266	\$4,618	\$1,649	\$3,208	\$13,155	\$64,068	234,407	291,841

* Class A waste volume = 20,250 ft³.