

DOCKETED

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Pacific Gas & Electric Response to Request for Data Related to California's Nuclear Power Plants

Additional submitted attachment is included below.

July 20, 2016

California Energy Commission
Docket Office, MS-4
Attention: Docket 16-IEPR-07
1516 Ninth Street
Sacramento, CA 95814-5512

**Re: Docket 16-IEPR-07: Response of Pacific Gas and Electric Company to May 23, 2016
Request for Data Related to California's Nuclear Power Plants, as Modified on July 1,
2016**

I. INTRODUCTION

Pacific Gas and Electric Company (PG&E) is pleased to provide responses to the California Energy Commission's (CEC) 2016 Integrated Energy Policy Report Update (2016 IEPR Update) Nuclear Data Request, as modified on July 1, 2016.

In preparing this response, PG&E first repeats the question, as shown in the data request, followed by PG&E's response. PG&E's responses address Diablo Canyon only.

II. NUCLEAR POWER PLANT DATA REQUEST

A. Nuclear Waste Accumulation

1. Please provide the most recent disposal plans and disposal cost assessments for low-level waste (categorized as Class A, B, C, or Greater-than Class-C) and spent nuclear fuel storage completed to satisfy this request.

In the Joint Proposal of PG&E and parties to retire Diablo Canyon Nuclear Power Plant (DCPP) at the expiration of the current operating licenses¹, PG&E has committed to preparing a Diablo Canyon site-specific decommissioning study for submittal to the CPUC no later than the date when the 2018 Nuclear Decommissioning Cost Triennial Proceeding will be filed. Current costs provided by existing vendors for Class A, B, C, and Greater-than-Class-C disposal are not suitable for estimating the

¹ Joint Proposal of Pacific Gas and Electric Company, Friends of the Earth, Natural Resources Defense Council, Environment California, International Brotherhood of Electrical Workers Local 1245, Coalition of California Utility Employees, and Alliance for Nuclear Responsibility to Retire Diablo Canyon Nuclear Power Plant at Expiration of the Current Operating Licenses and Replace it with a Portfolio of GHG Free Resources, <https://www.pge.com/includes/docs/pdfs/safety/dcpp/jointProposal.pdf>, p. 12-13

ultimate disposal costs of these wastes, given PG&E does not have the waste characterization or applicable state approval to ship decommissioning waste from Diablo Canyon to these sites, nor is a DCPD decommissioning contract in place that would set the price per cubic foot. Furthermore, a proposed merger between the two possible vendors (Energy Solutions in Utah and WCS in Texas) could, if completed, result in monopoly pricing that could be significantly greater than estimates last provided in the 2013 Integrated Energy Policy Report.

2. Please provide a table of waste generated, including number of spent fuel assemblies; metric tons of uranium; and volumes of low level waste (Class A-C & GTCC). This information should be categorized in a table by quantity generated through 2015, quantity expected at the end of license, and quantity expected during decommissioning.

Updates to Table 12: Waste Generated at Diablo Canyon (Units 1 and 2) and SONGS (Unit 1, 2 and Unit 3) from the AB 1632 Assessment of California's Operating Nuclear Plants: Final Report, October 2008 (CEC-100-2008-005-F, page 213). (Diablo Canyon, SONGS)

Diablo Canyon	Spent Fuel		Waste			
	(No. of Assemblies)	(Metric Tons) of Uranium)	Class A (ft ³)	Class B (ft ³)	Class C (ft ³)	GTCC (ft ³)
Total Generated through June 2016	3,190	1,371.3	15,803	1,146	1,353	Note 2 ²
2016 through end of license	1,192	512.56	2,592	432	0	Note 2
Decommissioning	0	0	1,206,787	3,700	1,178	3,298
Total	4,382	1,884.26	1,225,182	5,278	2,531	3,298

B. Spent Fuel Pool and Independent Spent Fuel Storage Installation

1. Please provide a progress report on the transfer of spent fuel from pools into dry casks (in compliance with Nuclear Regulatory Commission (NRC) spent fuel cask and pool storage requirements).

As of July 8, 2016, there are a total of 2,006 used fuel assemblies stored in the spent fuel pools. There are 37 casks loaded with a total of 1,184 assemblies. The current plan is to load 12 additional casks in 2016 and eight casks in each of the years 2018, 2020, and 2022.

2. Please provide an updated evaluation of the potential long-term impacts and projected costs of spent fuel storage in pools versus dry cask storage of higher burnup fuels in densely packed pools, and the potential degradation of fuels and package integrity during long-term wet and dry storage and transportation offsite.

² GTCC is not generated per se during reactor operation. Irradiated components will become GTCC upon disassembly of larger components during decommissioning.

No stand-alone cost-benefit analysis of wet vs. dry storage has been performed. Spent fuel is stored in pools for a minimum of five years before being placed in dry cask storage.

As stated previously by PG&E³, the operational cost of maintaining the dry cask storage facility is approximately \$2.5 million annually. This cost includes security and operational support. PG&E does not have specific numbers for the cost to maintain and operate the systems that support the spent fuel pool operation.

Cost/benefit studies have not been developed for the long-term storage of spent nuclear fuel at the DCPD site. It is assumed in budget development that PG&E will store spent nuclear fuel on site until the United States (US) Department of Energy (DOE) is ready to perform the removal of the spent fuel. Estimates of Direct Cost for movement of spent nuclear fuel into dry storage have been developed and planned for the near-term operating budgets. PG&E has developed a dry storage facility that is licensed and permitted to store all of the spent nuclear fuel generated during the 40-year licensed life of DCPD. It is still PG&E's position that the facility is an interim solution until the DOE assumes their responsibility and collects the fuel for reprocessing or long-term storage.

3. Please provide information on the developments of facility specific aging cask management programs onsite and within the nuclear engineering community, and any related technological considerations.

In June 2016, the NRC issued NUREG-1927, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel – Final Report," Revision 1 (Standard Review Plan). This Standard Review Plan provides guidance and information on review of aging management programs (AMPs), including learning AMPs that consider and respond to operating experience. The guidance provides example AMPs for welded stainless steel canisters, reinforced concrete structures, and a high burnup fuel monitoring and assessment program. PG&E is evaluating this document for the development of aging management programs.

4. Please provide updated tables on the status of spent nuclear fuel and current onsite storage capacity and a table summarizing the current spent fuel conditions including radiation levels. Tables on the current Independent Spent Fuel Storage Installation (ISFSI) should contain information on capacity, planned expansions and timetables, planned loading configurations and associated thermal loads, and estimated thermal loads of the current ISFSI multi-purpose canisters.

³ PG&E Response to the 2013 Integrated Energy Policy Report Nuclear Data Request, May 20, 2013. P.10-11. . <http://docketpublic.energy.ca.gov/PublicDocuments/Migration-12-22-2015/IEPR/2013%20IEPR/13-IEP-1J/TN%2070883%2005-19-13%20PG-E%E2%80%99s%20Response%20to%20the%202013%20Integrated%20Energy%20Policy%20Report%20Nuclear%20Data%20Request.pdf>

Updates to Table 14: On-Site Spent Fuel Capacity (number of assemblies) from the AB 1632 Assessment of California's Operating Nuclear Plants: Final Report, October 2008 (CEC-100-2008-005-F, page 217).

	Diablo Canyon	
	Assemblies	MTU
ISFSI Capacity	4,416	1,898.88
Planned Expansions	0	0
Total Planned ISFSI Capacity	4,416	1,898.88
Spent Fuel Pool Current Capacity	2,621	1,127.03
Total On-site Storage Capacity	7,037	3,025.91
Assemblies Generated during Current Licensing period	4,382	1,884.26
Spent Fuel Pool Original Design Capacity (Before re-racking)	540	232.2

The radiation levels and thermal loads will be maintained within the limits defined in the Diablo Canyon ISFSI Technical Specifications.

5. Alternative spent fuel management schemes to expeditiously transfer spent nuclear fuel assemblies from the wet spent fuel pool to dry casks in the ISFSI. PG&E alternate plans, if any, to isolate the spent fuel pool to eliminate the need for using Pacific Ocean seawater for cooling the spent fuel pool system. Information demonstrating sufficient space for all spent fuel (fuel consumed if Diablo Canyon was relicensed) to be kept on site in the ISFSI and also all assessments of the lifetime of the dry casks.

PG&E has not evaluated reducing the loading schedule at DCPD after shutdown but notes that it would require a revision to PG&E's NRC license and evaluation of cask and support equipment changes and the possibility of major facility demolitions and construction.

III. CONCLUSION

Please feel free to contact me with any questions you may have on PG&E's responses to this data request.

Sincerely,

/s/

Wm. Spencer Olinek

Cc: Justin Cochrane