Pacific Gas and Electric Company

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October 22, 2018

PG&E Letter HIL-18-008

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 72.42

Docket No. 72-27, Materials License No. SNM-2514
Humboldt Bay Independent Spent Fuel Storage Installation
Response to NRC Letter dated September 20, 2018, "Request for Supplemental Information for the Technical Review of the Application for Renewal of the Humboldt Bay Independent Spent Fuel Storage Installation License No. SNM-2514 (CAC No. 001028)"

Dear Commissioners and Staff:

By Pacific Gas and Electric Company (PG&E) Letter HIL-18-006, "License Renewal Application for the Humboldt Bay Independent Spent Fuel Storage Installation," dated July 10, 2018 (ML18215A180, ML18215A213), PG&E submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for the renewal of Materials License SNM-2514, for the Humboldt Bay (HB) Independent Spent Fuel Storage Installation (ISFSI).

By letter dated September 20, 2018 (CAC/EPID No. 001028/L-2018-RNW-0016), the NRC staff requested supplemental information (RSI) to support their review of the HB ISFSI License Renewal Application (LRA).

Enclosure 1 contains PG&E's responses to the RSIs. Enclosure 2 contains the LRA Amendment 1 resulting from the RSI responses with the changes designated by change bars in the left margin. The LRA is being provided on one disk labeled, "Humboldt Bay Independent Spent Fuel Storage Installation Site Specific License Renewal Application, Revision 1, October 2018."

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

If you have any questions regarding this response, please contact Mr. Philippe Soenen at (805) 459-3701.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 22, 2018.

Sincerely,

Jan A. Nimick
Senior Director, Engineering, Technical and Emergency Services

Enclosures
cc: Humboldt Distribution
cc/enc: William C. Allen, NMSS Project Manager
Christopher Markley, NMSS Project Manager
Kriss M. Kennedy, Region IV Administrator
Gonzalo L. Perez, California Department of Public Health

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RSI HB1

Provide a justification (e.g., analysis, test, inspection, etc.) for treating the external environment of the HI-STAR Humboldt Bay (HB) greater than Class C (GTCC) Waste Container (GWC) as "embedded" (i.e., with no potential ingress of moisture or contaminants).

The application states that the external HI-STAR HB GWC subcomponents are exposed to the internal HI-STAR GTCC overpack environment (i.e., enclosed air environment), which is ambient air. The application also states that no overpack drying was implemented during the closure of the bolted overpack, thus, the enclosed air environment, while isolated during the long-term storage period, is considered saline air (Table 3.1-2). The application also states the bolted overpack does not allow for the opportunity to introduce additional water or oxygen to the environment after initial overpack bolting and is thus similar to an embedded environment.

Table 3.7-1 of the application includes localized corrosion (crevice corrosion and pitting corrosion) as a possible aging mechanism in the Aging Management Review of GWC. The applicant excluded the potential for localized corrosion and chloride-induced stress corrosion cracking (CISCC) because the GWC was assumed to be maintained in an embedded environment, consistent with guidance provided in NUREG-2214. However, there is no justification to support the assumption that the enclosed air environment performs similar to an embedded environment in the bolted overpack without seals.

The staff requests that the applicant provide a justification (e.g., analysis, test, inspection, etc.) for treating the external environment of the GWC as "embedded," such that localized corrosion and CISCC can be excluded during the renewal period.

This information is needed for evaluating HI-STAR Humboldt Bay (HB) ISFSI Renewal, in compliance with in 10 CFR 72.42 (a)(1).

PG&E Response to RSI HB1

As discussed in License Renewal Application (LRA) Sections 3.7.4.1 and 3.8.4.1, an enclosed air environment is created on the exterior of the GWC and the interior of the HI-STAR HB GTCC Overpack by the bolted overpack lid design. While the GTCC Overpack does not contain seals to maintain a pressure boundary, the lid and flange seating surfaces are machined surfaces, such that material gaps across which water and/or oxygen would traverse, are minimized. The design limits the opportunity to

introduce additional water or oxygen to the environment after initial cask bolting as follows.

The GTCC Overpack is located within the HB ISFSI vault sheltered environment which is protected from weather-related effects, including insolation, wind, rain, snow, and ice. Even if a leakage path were to develop across the metal-to-metal sealing surface, there is minimal force pulling air or water into the GTCC Overpack.

For outside air to enter the GTCC Overpack, a leakage path would need to develop through the bolted metal-to-metal boundary created by the carbon steel top flange and carbon steel closure lid. Consistent with the Draft MAPS Report and as shown in LRA Table 3.8-1, there are a limited number of causes for failure of these carbon steel surfaces during the license renewal period - corrosion (crevice, galvanic, general, and pitting) of the metal-to-metal sealing surface leading to development of a leakage path into the GTCC Overpack.

Research (Reference: Practical Building Conservation: Metals ISBN 13: 9780754645559) states the corrosion rate of carbon steel in a submerged marine environment varies from 0.0024-0.0043 inches/year (60-110 micrometers (µm)/year) and 0.0004-0.0028 inches/year (10-70 µm/year) in a submerged industrial environment (more aggressive environments than the HB ISFSI embedded environment). Alloy steels (with Cr and Cu) initially may corrode, if exposed to these environments, but wetting and drying allows pores to fill and the corrosion rate slows down to 0.0006 inches/year (15 µm/year) after 5 years in a marine environment and 0.0002 inches/year (5 µm/year) after 5 years in an industrial environment.

If it is conservatively assumed that over a 1-year period, up to 0.0043 inches (0.110 millimeters) of wall loss may be experienced due to various corrosion mechanisms, this results in a total of 0.258 inches (6.60 millimeters) of wall loss over a 60-year period. Since this is an interstitial gap with little to no communication with the external environment, the amount of corrosion on the metal-to-metal sealing surface would be minimal.

In conclusion, consistent with the Draft MAPS Report definition for an embedded environment which "may prevent ingress of water and contaminants," PG&E is treating the external environment of the GWC and the interior of the HI-STAR HB GTCC Overpack as an embedded environment, such that localized corrosion and chloride-induced stress corrosion cracking of the GWC can be excluded during the license renewal period.

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In conclusion, consistent with the Draft MAPS Report definition for an embedded environment which "may prevent ingress of water and contaminants," PG&E is treating the external environment of the GWC and the interior of the HI-STAR HB GTCC Overpack as an embedded environment, such that localized corrosion and chloride-induced stress corrosion cracking of the GWC can be excluded during the license renewal period.

Further, HB ISFSI FSAR Update, Revision 6, Section 4.3.2.1.2 states the "cask transporter, connector pins, and lift links are . . . qualified for MPC and overpack loading operations by testing prior to service." Thus, a Cask Transportation System Aging Management Program has been developed based on the current maintenance activities that are conducted to ensure compliance with the FSAR.

- Aging management of the lid retention device has been incorporated into the HB ISFSI External Surfaces Monitoring Aging Management Program.

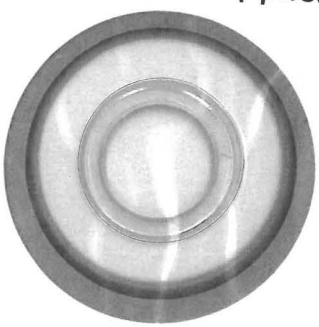
Enclosure 2
PG&E Letter HIL-18-008

License Renewal Application (LRA) Amendment 1
Affected LRA Sections and Tables

License Renewal Application (LRA) Amendment 1
Affected LRA Sections and Tables

LRA Section	Reason for Change
Table of Contents	RSI HB2
Section 2 (throughout)	RSI HB2
Section 3 (throughout)	RSI HB1 and HB2
Appendix A	RSI HB2
Appendix D	RSI HB2

umboldt Bay Independent
Spent Fuel Storage Installation
Site Specific
License Renewal Application



Revision 1
October 2018