

August 16, 2011

Mr. James R. Becker
Site Vice President and Station Director
Diablo Canyon Power Plant
Mail Code 104/5/502
P.O. Box 56
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION
MATERIALS LICENSE NO. SNM-2511, AMENDMENT REQUEST NO. 2 – FIRST
REQUEST FOR ADDITIONAL INFORMATION (TAC NO. L24515)

Dear Mr. Becker:

By letter dated January 31, 2011, as supplemented June 8, and July 28, 2011, Pacific Gas and Electric Company (PG&E) submitted an application to the United States Nuclear Regulatory Commission (NRC) to amend Materials License No. SNM-2511 for the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI).

The NRC staff (staff) has reviewed your application and has determined that additional information is required to complete its detailed technical review. We request that you provide this information by September 15, 2011, to support completion of our evaluation in October 2011. Inform us at your earliest convenience, but no later than September 2, 2011, if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay.

This information was discussed with Mr. Michael Richardson of your staff on August 15, 2011. Please reference Docket No. 72-26 and TAC No. L24515 in future correspondence related to this licensing action. If you have any questions, please contact me at (301) 492-3325.

Sincerely,

/RA/

John Goshen, P.E., Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No.: 72-26
TAC No.: L24515

Enclosure: As stated

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SUBJECT: DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION
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The NRC staff (staff) has reviewed your application and has determined that additional information is required to complete its detailed technical review. We request that you provide this information by September 15, 2011, to support completion of our evaluation in October 2011. Inform us at your earliest convenience, but no later than September 2, 2011, if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay.

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John Goshen, P.E., Project Manager
 Licensing Branch
 Division of Spent Fuel Storage and Transportation
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Docket No.: 72-26
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Enclosure: As stated

cc: Service List

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DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION

DOCKET NO. 72-26

LICENSE AMENDMENT REQUEST NO. 2

FIRST REQUEST FOR ADDITIONAL INFORMATION

By letter dated January 31, 2011, as supplemented June 8, and July 28, 2011, Pacific Gas and Electric Company (PG&E) submitted an application to the United States Nuclear Regulatory Commission (NRC) to amend (LAR-2) Materials License No. SNM-2511 for the Diablo Canyon (DC) Independent Spent Fuel Storage Installation (ISFSI). The NRC staff (staff) has reviewed your application and has determined that additional information is required to complete its detailed technical review.

6.0 Thermal Evaluation

- 6.1 Explain the reasons why the design ambient temperatures may be exceeded without exceeding the fuel temperature limits.

A note in Table 1.2 of Holtec Report HI-2104625 states that the design ambient temperatures may be minimally exceeded without exceeding the fuel temperature limits. Provide site information to justify the design ambient temperatures. This information should include maximum average values and length. If the duration at ambient temperatures higher than design limits is long enough to achieve thermal equilibrium, then the higher temperature should be considered the design ambient temperatures.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6.2 Clarify the maximum heat load and operating pressure being requested in this license amendment. Holtec Report HI-2104625 includes two different scenarios with thermal evaluations performed based on these two scenarios. The thermal calculations performed for two different scenarios are not clearly described, and the staff can't make a safety determination based on these calculations. The thermal evaluation should be modified to include only the thermal calculations for what is being requested in this amendment.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-3 Clarify if the multi-purpose canister (MPC) gas and fuel effective thermal conductivity included the effect of gas dilution during the 100% rod rupture accident.

Holtec Report HI-2104625 states that the 100% rod rupture accident is evaluated with due credit for increased heat dissipation under increased molecular weight of the cavity gases. However, it is not clear how the gas dilution affects the heat dissipation.

Enclosure

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-4 Clarify if the temperatures with fuel spacers reported in Table B.5.10 of Holtec Report HI-2104625 were obtained based on the finest mesh. Note 18 on this table states that all temperatures tabulated herein include the temperature adder reported in Table B.5.2 for all the components. The calculation should be performed at the design basis heat load and operating pressure for the finest mesh and the resulting temperature should be reported in the thermal evaluation.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-5 Explain the reasons why for the same storage system Table B.5.13 of report HI-2104625 includes different temperature limits for the two scenarios described in this report. Specifically for the MPC shell, lid bottom plate, and lid top plate, the temperature limits are different. The amendment should only include results from the thermal evaluation of what is being requested. See also RAI 6-2.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-6 Demonstrate that multiplying the thermal conductivity of air by 1.4 is equivalent to using equation C.2.1 of report HI-2104625 to calculate the effective radial thermal conductivity of air based on this equation without modifying the air conductivity and considering the material expansion (and therefore gap reduction.)

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-7 Clarify why a helium absolute pressure of 7 atm is conservative for MPC internal convection heat transfer during on-site transfer of the MPC in the HI-TRAC. Clarify what is the absolute operating pressure of the MPC. It appears from the amendment request that the design operating pressure is 5 atm absolute. Assuming a higher operating pressure is non-conservative because it overstates internal convection heat transfer.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-8 Perform the on-site transfer thermal evaluation for the thermal-hydraulic conditions being requested in this amendment application. The staff can't make a safety determination if adequate supporting analyses are not provided. Most of the thermal analyses provided in the amendment request correspond to conditions which are not being requested. See also RAI 6-2.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-9 Provide a definition for “operable” for LCO 3.1.4. As part of surveillance requirement SR 3.1.4.1, provide monitored parameters for the system user to conclude that the supplemental cooling system is operable.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-10 Clarify if the cask transfer facility (CTF) thermal analysis includes the effect of wedge assemblies in the convective heat transfer. Page 4.4-14 of the Final Safety Analysis Report (FSAR) states that with the CTF wedge assemblies in place between the loaded overpack and the CTF walls, there is still some convective heat transfer through the overpack, albeit not at a rate commensurate with the conditions on the ISFSI pad. Since this hardware affects the convective air flow, its effect should be included in the calculation of peak cladding temperature for the CTF configuration.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-11 Explain the reasons why during the 100 percent vent blockage the peak cladding temperature is the same for either the thermo-siphon enabled or thermo-siphon suppressed solutions.

Page 8.2.58 of the FSAR states that both the thermosiphon-enabled solution and the thermosiphon-suppressed solution compute approximately the same peak cladding temperature.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-12 PG&E should remove all references to vacuum drying in the FSAR, since the MPC is dried using the forced helium dehydration system only. The FSAR contains statements in several places which may imply that vacuum could also be used to dry the MPC.

This is requested to provide accuracy, clarity, and consistency within the FSAR.

- 6-13 Please refer to Holtec Report HI-2104625. It is not clear if computational fluid dynamics (CFD) best practice guidelines (BPG) were used to perform the thermal evaluation of the HI-STORM 100 in the CTF configuration for design basis heat load and ambient conditions and to obtain the discretization error. It is not clear that the thermal analysis results provided in Table B.5.9 of Holtec Report HI-2104625 include adequate margins. In order to facilitate the review, the analysis results should include an estimate of the numerical uncertainty, grid convergence, and sensitivity of the performed CFD analyses. To assist in the technical review, please provide an estimate of the numerical uncertainty and provide a response to the following questions:

- a) Has a sensitivity analysis been performed concerning turbulence modeling, boundary conditions, grid independence and grid convergence?

- b) Was grid convergence index (GCI) used to assess uncertainty of the predicted results?

Provide results such as percentage of the calculation discretization error and analysis files used to obtain the GCI. The applicant may consult the following documents for further information on CFD BPG: (1) Best Practice Guidelines for the use of CFD in Nuclear Reactor Safety Applications, NEA/CSNI/R(2007)5, (ADAMS accession number ML071581053); and (2) Policy of Journal of Fluid Engineering of ASME about CFD analyses.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-14 Verify that for all thermal calculations an adequate operating density is provided in the analysis models. When reviewing some of the analysis files, the staff noticed that the operating density provided as input does not seem to be adequately calculated for the air side. The air operating density for the air side provided as input in the Fluent thermal models should correspond to the operating conditions of pressure and temperature.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

- 6-15 Verify that all the thermal models used in the thermal evaluation include adequate insulation values. When reviewing some of the analysis files, the staff noticed that some surfaces that are exposed to solar heating did not include a heat source, as a result of insulation.

This information is needed to determine compliance with 10 CFR 72.122 and 10 CFR 72.128.

8.0 Materials Evaluation

- 8-1 Provide additional information regarding the type and properties for nonfuel hardware such as Neutron Source Assemblies (NSA), Instrument Tube Tie Rods (ITTR) and components of these devices such as individual rods in terms of galvanic/corrosive reactions. The staff recognizes that the ITTRs were approved for storage as non fuel hardware in the HI-STORM 100 Cask System in Amendment No. 6. However, that was for use for general certificate users. The licensee needs to provide information showing the applicability and acceptability for use at the DC site specific ISFSI. Additionally, the staff is concerned with compatibility between component materials and canister interior components, and needs additional information to ensure technical acceptability.

This information is needed to determine compliance with 10 CFR 72.120(d)

- 8-2 Provide additional design and operation details concerning the referenced "keep full system" to be used as a supplemental cooling system (SCS) for high burnup fuel during transfer to the ISFSI site.

The licensee is requesting an exemption to 10 CFR 72.236(f) similarly to that requested by Holtec for use in CoC No. 1014 for its SCS. However, since the DC ISFSI is a site specific license, 10 CFR 72.236(f) is not applicable. However, the requirements of 10 CFR 72.128(a)(5) are applicable. It is difficult from the information supplied by the licensee to determine if this system acceptably meets this requirement. The additional heat load affects the materials evaluation of the canister components.

This information is needed to determine compliance with 10 CFR 72.128(a)(4).

9.0 Confinement Evaluation

- 9-1 Clarify the information concerning the details of helium leak tests discussed in the DC ISFSI FSAR, Section 4.2.3.3.6, "Confinement Design."

The staff specifically requests additional information on testing of the base material, including the MPC shell, baseplate, lid, port covers, etc., performed by Holtec and PG&E to ensure confinement integrity over the life of the HI-STORM 100 MPC.

This information is needed to determine compliance with 10 CFR 72.122(h) and 10 CFR 72.126(d).