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May 23, 2013

PG&E Letter DIL-13-008

U.S. Nuclear Regulatory Commission
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Director, Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards
11555 Rockville Pike
Rockville, MD 20852

10 CFR 72.56

Materials License No. SNM-2511, Docket No. 72-26
Diablo Canyon Independent Spent Fuel Storage Installation
Response to NRC Questions Regarding License Amendment Request 12-03

Dear Commissioners and Staff:

Pacific Gas and Electric Company (PG&E) Letter DIL-12-007, "License Amendment Request 12-03, 'Revision to Technical Specification (TS) 2.0, 2.3, 3.1.1, and 3.1.4,'" dated July 31, 2012, was submitted to request an amendment to Materials License No. SNM-2511, Docket No. 72-26, for the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI), to revise the TS to allow the additional loading and moving of high burnup spent fuel from the spent fuel pool to the ISFSI.

By letter dated November 5, 2012, "Diablo Canyon Independent Spent Fuel Storage Installation Material License No. SNM-2511, Amendment Request No. 3 – Acceptance Review (TAC No. L24675)," the NRC staff determined the application had sufficient technical information in scope and depth to allow the staff to proceed with the technical review. An observation was noted in the response.

On January 22, 2013, the NRC staff requested additional information required to complete the review of License Amendment Request (LAR) 12-03. On March 14, 2013, PG&E submitted a response to the request and to the observation noted in the acceptance review letter.

On April 18, 2013, the NRC staff requested additional information required to complete the review of LAR 12-03.

This information does not affect the results of the technical evaluation or the no significant hazards consideration determination previously transmitted in PG&E Letter DIL-12-007.

NMSS26

Attachment 3 of the Enclosure contains information proprietary to Holtec International (Holtec). Accordingly, Attachment 2 of the Enclosure includes a Holtec affidavit pursuant to 10 CFR 2.390. The affidavit is signed by Holtec, the owner of the information. The affidavit sets forth the basis on which the Holtec proprietary information contained in Attachment 3 to the Enclosure may be withheld from public disclosure by the NRC, and it addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390 of the NRC's regulations. PG&E requests that the Holtec proprietary information be withheld from public disclosure in accordance with 10 CFR 2.390.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions regarding this response, please contact Mr. Lawrence Pulley at (805) 545-6165.

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

Executed on May 23, 2013.

Sincerely,

Barry S. Allen
Site Vice President

Mjrm/4557/50500439
Enclosure
cc: Diablo Distribution
cc/enc: John M. Goshen, NMSS Project Manager
Thomas R. Hipschman, NRC Senior Resident Inspector
Arthur T. Howell III, NRC Region IV Administrator
Gonzalo L. Perez, California Department of Public Health

Enclosure
PG&E Letter DIL-13-008

Response to NRC Questions Regarding License Amendment Request 12-03

ATTACHMENTS:

1. Holtec International Report HI-2125191, "Three-Dimensional Thermal-Hydraulic Analyses for Diablo Canyon Site-Specific HI-STORM System with up to 28.74 kW Decay Heat," Revision 2 - Non-Proprietary Version
2. Holtec Affidavit for Holtec International Report HI-2125191, "Three-Dimensional Thermal-Hydraulic Analyses for Diablo Canyon Site-Specific HI-STORM System with up to 28.74 kW Decay Heat," Revision 3 - Proprietary Version, and the associated proprietary data files on a CD-ROM
3. Holtec International Report HI-2125191, "Three Dimensional Thermal-Hydraulic Analyses for Diablo Canyon Site-Specific HI-STORM System with up to 28.74 kW Decay Heat," Revision 3 - Proprietary Version, with associated proprietary data files on a CD-ROM

Response to NRC Questions Regarding License Amendment Request 12-03

Background

On January 22, 2013, the NRC staff requested additional information required to complete the review of License Amendment Request (LAR) 12-03. On March 14, 2013, Pacific Gas and Electric Company (PG&E) submitted a response to the request and to the observation noted in the acceptance review letter. The response included a revised thermal report (Holtec Report HI-2125191, Revision 1). The report revised Appendix E to refine the grid convergence index for the thermal models and added an Appendix F to document the sensitivity studies in support of the response to the NRC request.

On April 18, 2013, the NRC provided a second request for additional information (RAI). On May 14, 2013, PG&E proposed to the NRC project manager to provide a submittal response to the RAIs by May 23, 2013. PG&E's responses to the NRC questions are provided below.

PG&E includes as Attachment 3 of this enclosure a revised thermal analysis (Holtec Report HI-2125191, Revision 3). In Revision 2 of the report, PG&E specifically adopted Revision 1, Appendix F Cases 2 and 3 into the site-specific thermal analyses for HI-STORM and HITRAC, respectively, and is reflected in the response to NRC Question 2 below as Tables 1 and 2. Revision 3 of Holtec Report HI-2125191 corrected numerical differences in some pressure values due to rounding errors introduced during unit conversion. Revision 3 of Holtec Report HI-2125191 includes revision bars for both the Revision 2 and Revision 3 changes for comparision with Revision 1 of the report.

Because the changes from Revision 2 to Revision 3 impact tables that are proprietary, a new non-proprietary Revision 3 was not created. A non-proprietary Holtec Report HI-2125191, Revision 2, is provided in Attachment 1 of this enclosure.

NRC Question 1:

6.1 Clarify that the multipurpose canister operating pressure is for both uniform and regionalized loading patterns.

Design heat load scenarios are described in Table 1.3 of Holtec Report HI-212191. However, Appendix F of the same report has a different operating pressure for on-site transfer configuration with regionalized loading pattern. Therefore, the thermal evaluation results provided in the calculation report may not correspond to the design operating pressure.

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

PG&E Response:

Table 1.3 of Holtec Report HI-2125191, Revision 1, describes the design heat load scenarios and the corresponding multipurpose canister (MPC) operating pressure used in the thermal analyses. The operating pressure tabulated in Table 1.3 corresponds to the value used in the thermal analysis of an MPC under normal storage condition in HI-STORM that uses Holtec evaluated reference flow resistance through the fuel assemblies (Reference 1). The reference values of flow resistance used in the evaluations were consistent with the approved HI-STORM 100 Final Safety Analysis Report (FSAR). However, based on the first round of RAIs on Materials License No. SNM-2511 Amendment 3 and an NRC memorandum (Reference 2), the flow resistance through the pressurized water reactor (PWR) fuel assemblies was increased to $1x10^6$ per square meter. Therefore, to address NRC's concerns in the first round of RAIs including the increased flow resistance, additional thermal analyses were performed for the following configurations and documented in Appendix F of Holtec Report HI-2125191, Revision 1:

- HI-STORM in the cask transfer facility (CTF)
- Normal On-Site Transfer using HI-TRAC

The thermal analyses of normal long-term storage in HI-STORM documented in Section B.5.1 of Holtec Report HI-2125191, Revision 1, shows that predicted temperatures in Scenario 1 (uniform loading pattern) bounds Scenario 2 (regionalized loading pattern).

The thermal analyses of above mentioned configurations documented in Appendix F of Holtec Report HI-2125191, Revisions 2 and 3, were also performed for the most limiting thermal condition (i.e., Scenario 1 with a uniform loading pattern). These evaluations in Appendix F were performed with a flow resistance equal to $1x10^6$ per square meter (Reference 2). The predicted temperatures and pressures increased due to this change, and therefore the operating pressure used in the analyses documented in Appendix F, are also different from those tabulated in Table 1.3.

The MPC operating pressure used in the thermal analyses is dependent on the helium backfill specification and the average temperature of gas inside the MPC under the hot operating condition. Since the helium backfill specifications in Table 1.1 of Holtec Report HI-2125191 (all revisions), are the same for all scenarios, the MPC operating pressure may differ based on the heat load and the analyzed scenario. The MPC-32 pressures are computed in an EXCEL spread sheet "mpc_pres_R2.xls" which is provided to the NRC staff in this submittal for review. The MPC operating pressures used in the analysis are documented in Appendix F and are below the pressure limit specified in the Diablo Canyon Independent Spent Fuel Storage Installation FSAR.

NRC Question 2:

6.2 Provide analysis results to show the limiting scenario for the on-site transfer configuration.

Appendix C of Holtec Report HI-212191 states that on-site transfer conditions are analyzed for scenario 1 (limiting configuration). However, the computational fluid dynamics analysis for this configuration appears to be for scenario 2 (see Table 1.3 of Holtec Report HI-212191.)

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

PG&E Response:

The FLUENT case files have been verified to confirm that the uniform loading pattern was analyzed for normal on-site transfer configuration. The thermal analyses of normal long-term storage in HI-STORM documented in Section B.5.1 of Holtec Report HI-2125191, Revision 1 and Revision 2, show that predicted temperatures in Scenario 1 (uniform loading pattern) bounds Scenario 2 (regionalized loading pattern).

The thermal analysis of normal on-site transfer in Appendix C has been performed for the most limiting condition (i.e., Scenario 1). Sections C.1, C.3, C.4 and C.5 clearly state that all the thermal evaluations for normal on-site transfer are performed for the most limiting scenario of uniform loading pattern (Scenario 1).

The results of the refined analyses have been combined with the pre-Appendix F results and are provided for normal long-term conditions in Table 1 below for HI-STORM (based on Holtec Report HI-2125191, Revision 2, Table B.5.12) and Table 2 below for HI-TRAC (based on Holtec Report HI-2125191, Revision 2, Tables C.2 and C.5).

Table 1 – Maximum Temperatures and MPC Cavity Pressure for HI-STORM in CTF with Increased Flow Resistance

Component	Temperature °C (°F)	Temperature Limit °C (°F)
Fuel Cladding	387 (729)	400 (752)
MPC Basket	384 (723)	385 (725)
Basket Periphery	288 (551)	385 (725)
MPC Shell	207 (405)	232 (450)
Overpack Inner Shell	135 (275)	177 (350)
Overpack Outer Shell	63 (146)	177 (350)
Lid Bottom Plate	116 (241)	177 (350)
Lid Top Plate	84 (182)	177 (350)
Overpack Body Concrete[1]	94 (201)	149 (300)
Overpack Lid Concrete[1]	99 (210)	149 (300)
Average Air Outlet	88 (191)	-
MPC Cavity Pressure kPa (psig)		
Normal Condition (No Rod Rupture)	540.4 (78.4)	689.3 (100)

[1] Maximum section average temperature is reported.

Table 2 – Maximum Temperatures and MPC Cavity Pressure for HI-TRAC under Normal On-Site Transfer Condition with Increased Flow Resistance, Fluid Annular Gap and Temperature-Dependent Water Density

Component	Temperature °C (°F)	Short-Term Operation Temperature Limit °C (°F)
Fuel Cladding	389 (732)	Moderate Burnup Fuel: 570 (1058) High Burnup Fuel: 400 (752)
MPC Basket	386 (727)	510 (950)
Basket Periphery	289 (552)	510 (950)
MPC Shell	217 (423)	413 (775)
HI-TRAC Inner Shell	126 (259)	204 (400)
Water Jacket Outer Shell	112 (234)	177 (350)
Water Bulk Temperature in Water Jacket	109 (228)	153 (307)
Axial Neutron Shield[2]	131 (268)	149 (300)
MPC Cavity Pressure kPa (psig)		
Normal Condition (No Rod Rupture)	557.6 (80.9)	689.3 (100)

[2] Maximum section average temperature is reported.

NRC Question 3:

6.3 *Provide adequate justification for the friction factor value used in the sensitivity study performed as part of the response to RAI 1, No. 6-6. Otherwise provide justification for the value used in the design analyses.*

The staff's analysis of the thermal-hydraulic data provided to Holtec (the cask vendor) by electronic mail on March 7, 2013, indicates that a fuel assembly viscous resistance factor of about a million would be an adequate value to validate the analysis against the thermal-hydraulic experimental data. This value should be considered in the DC ISFSI thermal evaluation.

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

PG&E Response:

Holtec has utilized Sandia National Labs experimental data described in NRC memorandum of Holtec-NRC public meeting dated February 12, 2013 (Reference 2). The data was provided to Holtec by the NRC. Therefore, based on this information received from the NRC, a flow resistance of $1x10^6$ per square meter through all the fuel assemblies was used in the thermal analyses of the most limiting configuration in HI-STORM and HI-TRAC and documented in Appendix F of Holtec Report HI-2125191, Revision 2.

The predicted peak cladding temperature component temperatures, and MPC cavity pressure increased due to the use of this flow resistance value. Conservatively, the component temperature rise in the HISTORM and HI-TRAC is added to all the normal, off-normal, and accident thermal evaluations of HI-STORM and HI-TRAC documented respectively in Appendices B and C of the report. All the safety conclusions made in the report remain unchanged.

References:

1. "Pressure Loss Characteristics for In-Cell Flow of Helium in PWR and BWR MPCs," Holtec Report HI-2043285, Revision 7.

2. "Summary of January 16, 2013, Holtec International, Inc. Meeting for the HISTORM 100 Cask System, Amendment Request No. 9 on Thermal Analysis (TAC NO. L24476)," Memorandum from John Goshen (NRC) to Anthony H. Hsia (NRC), February 12, 2013 (ML13043A525).

Enclosure
Attachment 1
PG&E Letter DIL-13-008

Holtec International Report HI-2125191, "Three Dimensional Thermal-Hydraulic Analyses for Diablo Canyon Site-Specific HI-STORM System with up to 28.74 kW Decay Heat," Revision 2 – Non-Proprietary Version

Enclosure
Attachment 2
PG&E Letter DIL-13-008

Holtec Affidavit for:

Holtec International Report HI-2125191, "Three Dimensional Thermal-Hydraulic Analyses for Diablo Canyon Site-Specific HI-STORM System with up to 28.74 kW Decay Heat," Revision 3 - Proprietary Version, with data files on a CD-ROM

Enclosure
Attachment 3
PG&E Letter DIL-13-008

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AFFIDAVIT PURSUANT TO 10 CFR 2.390

I, Joseph Cascio, depose and state as follows:

(1) I am the Holtec International Project Manager for the Diablo Canyon Independent Spent Fuel Storage Installation Project and have reviewed the information described in paragraph (2) which is sought to be withheld, and am authorized to apply for its withholding.

(2) The information sought to be withheld is Revision 3 of Holtec Report HI-2125191 and the accompanying CD-ROM with computer data files therefrom, which contains Holtec Proprietary information and is appropriately marked as such.

(3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

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(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a and 4.b, above.

(5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of

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a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed descriptions of analytical

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approaches and methodologies not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed by Holtec International. A substantial effort has been expended by Holtec International to develop this information. Release of this information would improve a competitor's position because it would enable Holtec's competitor to copy our technology and offer it for sale in competition with our company, causing us financial injury.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

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The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

Executed at Marlton, New Jersey, this 21st day of May, 2013.

Joseph Cascio
Holtec International