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LR-N10-0210

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Hope Creek Generating Station
Facility Operating License No. NPF-57
NRC Docket No. 50-354

Subject: Response to Request for Additional Information - License Amendment Request (H09-01) Supporting the Use of Co-60 Isotope Test Assemblies (Isotope Generation Pilot Project)

References: (1) Letter from PSEG to NRC, "License Amendment Request Supporting the Use of Co-60 Isotope Test Assemblies (Isotope Generation Pilot Project)," dated December 21, 2009

(2) Letter from PSEG to NRC, "Response to Request for Additional Information - License Amendment Request (H09-01) Supporting the Use of Co-60 Isotope Test Assemblies (Isotope Generation Pilot Project)," dated May 11, 2010

In Reference 1, PSEG Nuclear LLC (PSEG) submitted a license amendment request (H09-01) for the Hope Creek Generating Station (HCGS). Specifically, the proposed change would modify License Condition 2.B.(6) and create new License Conditions 1.J and 2.B.(7) as part of a pilot program to irradiate Cobalt (Co)-59 targets to produce Co-60. In addition to the proposed license condition changes, the proposed change would also modify Technical Specification (TS) 5.3.1, "Fuel Assemblies," to describe the specific Isotope Test Assemblies (ITAs) being used.

In Reference 2, PSEG Nuclear LLC (PSEG) submitted responses to an NRC Request for Additional Information (RAI) on the license amendment request, with the exception of responses to RAI Questions 4, 5 and 6. The responses to these questions are provided in Attachment 1 of this letter. An Errata and Addendum (E&A) to NEDC-33529P (Attachment 3 to Reference 1) will be subsequently provided incorporating both the changes discussed in Attachment 1 to this letter and those previously discussed in Reference 2.

Attachment 1 to this letter provides information which GEH considers to be proprietary. The proprietary information is identified by bracketed text. GEH requests that the proprietary information in Attachment 1 be withheld from public disclosure, in accordance with the requirements of 10 CFR 2.390, "Public inspections, exemptions, requests for withholding,"

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paragraph (a)(4). A signed affidavit supporting this request is provided in Attachment 2 to this letter. Attachment 3 to this letter provides a nonproprietary version of Attachment 1. Attachment 4 to this letter provides additional proposed changes to the HCGS Facility Operating License (FOL).

PSEG has reviewed the information supporting a finding of no significant hazards consideration that was provided in Reference 1. The additional information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. No new regulatory commitments are established by this submittal.

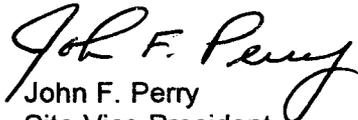
PSEG has also re-assessed the requested amendment approval date of September 1, 2010 provided in Reference 1 and proposes to revise that date to October 1, 2010.

If you have any questions or require additional information, please do not hesitate to contact Mr. Jeff Keenan at (856) 339-5429.

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

Executed on June 10, 2010
(Date)

Sincerely,


John F. Perry
Site Vice President
Hope Creek Generating Station

Attachments (4)

S. Collins, Regional Administrator - NRC Region I
R. Ennis, Project Manager - USNRC
NRC Senior Resident Inspector - Hope Creek
P. Mulligan, Manager IV, NJBNE
Commitment Coordinator – Hope Creek
PSEG Commitment Coordinator - Corporate

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Attachment 2
GE-Hitachi Affidavit for Withholding Portions of RAI Responses from Public Disclosure

**GE-Hitachi Nuclear Energy Americas LLC
AFFIDAVIT**

I, James F. Harrison, state as follows:

- (1) I am the Vice President, Fuel Licensing, Regulatory Affairs, GE-Hitachi Nuclear Energy Americas LLC ("GEH"), have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in Enclosure 1 of Global Nuclear Fuel-Americas, LLC letter, LRW-PSG-KT1-10-060, Lauren Watts to Don Notigan (PSEG Nuclear), entitled "Responses to Request for Additional Information 4 and 5 Related to License Amendment Request to Modify Hope Creek Generating Station Facility Operating License in Support of the Use of Isotope Test Assemblies," dated June 11, 2010. GEH proprietary information in Enclosure 1, which is entitled "Responses to Request for Additional Information 4 and 5," is identified by a dotted underline inside double square brackets. ~~[[This sentence is an example.¹³¹]]~~ A "[[" marking at the beginning of a table, figure, or paragraph closed with a "]" marking at the end of the table, figure or paragraph is used to indicate that the entire content between the double brackets is proprietary. In each case, the superscript notation ¹³¹ refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.
- (3) In making this application for withholding of proprietary information of which it is the owner, GEH 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 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought 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).
- (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 GEH's competitors without license from GEH 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 aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;
- d. 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) To address 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH, 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 GEH, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to 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 GEH 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 delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH 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 identified in paragraph (2), above, is classified as proprietary because it contains detailed results including the process and methodology for the design and analysis of the GE14i Isotope Test Assembly. The GE14i Isotope Test Assembly has been developed at a significant cost to GEH.

The development of the GE14i Isotope Test Assembly is derived from the extensive experience database that constitutes a major GEH asset.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and

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. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH.

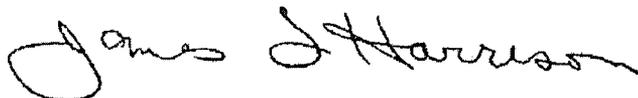
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH 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.

The value of this information to GEH 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 GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 11th day of June 2010.

A handwritten signature in black ink that reads "James F. Harrison". The signature is written in a cursive style with a large initial "J" and "H".

James F. Harrison
Vice President, Fuel Licensing
Regulatory Affairs
GE-Hitachi Nuclear Energy Americas LLC

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Attachment 3
Additional Information Supporting the Request for a License Amendment to
Modify HCGS Operating License in Support of the Use of Isotope Test
Assemblies
(Non-Proprietary)

**Attachment 3
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the gamma flux incident on the spent fuel pool wall. The MCNP calculation was done for cases where the bundle is placed one and four feet from the SFP wall. The incident flux calculations credited shielding by the water between the bundle and the wall, the stainless steel liner in the SFP, and self-shielding by the bundle. The highest incident flux on the concrete for each case was calculated. The GE14i results are shown in Table 1. GE14 results are also provided in Table 1 for comparison.

Table 3: Incident Gamma Energies at the Spent Fuel Pool Wall for One Bundle

Fuel Type	Distance from Closest Pins to Concrete Wall, feet	Incident Gamma Energy, MeV/(cm ² -sec)
GE14i	1	1.0x10 ¹¹
GE14	1	[[]]
GE14i	4	2.4x10 ⁸
GE14	4	[[]]

Per ANSI/ANS-6.4-2006, "Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants," incident fluxes less than 10¹⁰ MeV/(cm²-sec) result in negligible heating of the concrete. Therefore, a GE14i bundle placed four feet from the SFP wall will cause negligible heating of the concrete. In addition, because the four-foot incident energy is so far below the threshold, any array of GE14i bundles will also cause negligible heating of the concrete when stored at least four feet away from the SFP wall.

Per NUREG/CR-6927, "Primer on Durability of Nuclear Power Plant Reinforced Concrete Structures – A Review of Pertinent Factors," Feb. 2007, there is a possibility of some concrete degradation due to a total integrated gamma dose above 10¹⁰ Rad. The MCNP calculation was expanded to determine the energy deposition rate (dose rate) to the concrete wall. This calculation assumed a conservative value [[

]] The energy deposition calculation yielded the dose rate to the SFP wall.

The dose rates in the first cubic centimeter of concrete, where the dose is highest, were integrated to determine the time to reach 10¹⁰ Rad and the results are shown in Table 2. No credit was taken for decay of the fission products or cobalt from the 24-hour dose rates. Because the time to reach an integrated dose to the wall greater than 10¹⁰ Rad at four feet is significantly greater than the life of the plant, a single bundle or array of GE14i bundles will not pose a long term concrete degradation concern. Therefore, there is no limitation on the amount of time a GE14i bundle may remain in the SFP at the four-foot location.

Table 4: Irradiated Fuel Dose Rate and Integrated Dose at the HCGS Spent Fuel Pool Wall

Fuel Type	Distance from Closest Pins to Concrete Wall, feet	Dose Rate, Rad/hr	Years to Integrated dose of 10 ¹⁰ Rad
GE14i	1	[[]]	[[]]
GE14i	4	[[]]	[[]]

NRC RAI#5

Page 5 of Attachment 1 to the application dated December 21, 2009 (Reference 1) states: "In addition to these ITA examinations, cobalt isotope rods will be removed from the ITAs using the fuel prep machine located in the HCGS spent fuel pool. PSEG intends to remove one GE14i assembly after one cycle in the core and a single isotope rod will be removed from a GE14i assembly for inspection." Please provide the following information regarding the process of removal of the isotope rod from the ITA.

- (d) During the removal process, what will be the distance of the ITA from the SFP wall while the ITA is in HCGS fuel prep machine?
- (e) How long a time will the assembly normally be in the prep machine during the removal process?
- (f) What is the probability that the SFP wall will undergo significant gamma heating during the removal process?

RESPONSE TO RAI#5

- (d) During the removal process, the closest the ITA will be to the wall is approximately 14.75 inches.
- (e) It is expected that an ITA will normally be in the prep machine for [[]] hours.
- (f) Due to the close proximity of the GE14i bundle to the spent fuel pool wall during the removal process, the incident flux calculated as described in RAI 4 response yielded 1.0×10^{11} MeV/(cm²-sec) one foot from the SFP wall. Therefore, detailed concrete heatup calculations were performed using the energy deposition rate for a GE14i bundle in the fuel prep machine.

The calculation was performed at 12 inches from the fuel pool wall in order to be conservative to the 14.75 inches reported in 5(a) above. Fission product and cobalt activity were calculated as described in the response to RAI 4. The temperature rise in the concrete was calculated for this energy deposition using an ANSYS Release 11.0 SP-1, ANSYS Incorporated, finite element analysis. The calculation assumed conservative parameters for energy deposition and temperature rise in the concrete.

The result of these calculations is a steady-state temperature rise in the concrete of less than [[]]. In the absence of gamma heating, the temperature of the concrete walls of the HCGS spent fuel pool will be less than or equal to the temperature of the spent fuel pool water. Under normal operating conditions the peak temperature of the water is 125°F. Per HCGS FSAR Section 9.1.2.1 item 13, the spent fuel pool is designed to withstand the thermal stresses due to boiling in the spent fuel pool. The thermal gradient from this accident will govern the design of the fuel pool wall and liner. A [[]] increase in wall temperature under normal conditions will have an insignificant impact on the spent fuel pool wall or liner. So the temperature rise due to gamma heating has no detrimental effect on the concrete and there is no probability of significant gamma heating in the SFP wall for any period of time while the ITA is in the Fuel Prep Machine.

NRC RAI#6

In Attachment 8 to the application dated December 21, 2009 (Reference 1), PSEG made a regulatory commitment to “[r]evis[e] applicable Spent Fuel Pool Storage procedures to require storage of irradiated GE14i fuel bundles at least four feet from the wall of the SFP.” Consistent with the guidance in SECY-98-224, “Staff and Industry Activities Pertaining to the Management of Commitments Made by Power Reactor Licensees to the NRC,” dated September 28, 1998 (ADAMS Accession No. ML992870043), and NRR Office Instruction LIC-100, “Control of Licensing Bases for Operating Reactors” (ADAMS Accession No. ML010660227), escalating a licensee commitment into a legally binding requirement should be reserved for matters that warrant: (1) inclusion in the TSs based on the criteria in 10 CFR 50.36; or (2) inclusion in the license based on determination that the issue is of high safety or regulatory significance. As discussed in 10 CFR 50.36(c)(4), design features to be included in the TSs “are those features of the facility such as materials of construction and geometric arrangements, which if altered or modified, would have a significant effect on safety and are not covered in categories (c) (1), (2), and (3) of this section.” Since the proposed commitment to require storage of the ITAs at least four feet from the wall of the SFP relates to a geometric arrangement associated with maintaining integrity of the SFP wall, it appears that this design feature be included in Section 5.0, “Design Features,” of the HCGS TSs (specifically, TS 5.6, “Fuel Storage”). Please propose suitable legally binding requirements for storage of the ITAs in the SFP. The response should also address whether additional requirements are necessary with respect to the ITAs while they are located in the fuel prep machine (see RAI 5 above).

RESPONSE TO RAI#6

PSEG proposes to add a license condition (2.C.23) that addresses the storage requirement of the ITAs in the SFP. Specifically 2.C.23 will state: “Irradiated GE14i fuel bundles shall be stored at least four feet from the wall of the Spent Fuel Pool.” See Attachment 4 of this submittal. This is consistent with the ITA pilot program approved for Clinton Power Station (CPS) by Amendment 190 (ADAMS ML100200005). As discussed in RAI 5 above, there is no probability of significant gamma heating in the SFP wall during the removal process; therefore no additional requirements are necessary with respect to the ITAs while they are located in the fuel prep machine.

Placing this restriction in the facility operating license as a license condition is appropriate, versus placing the restriction in the TSs. 10CFR 50.36(c)(4) establishes criteria for design “features of the facility” that should be located in the TSs. For this ITA pilot program, the storage of the ITAs is not a feature, or geometric arrangement, of the facility but instead an aspect of a pilot program or process related to a moveable element. As such, in lieu of a regulatory commitment, a license condition is appropriate, similar to what was approved for CPS via Amendment 190. This is also similar to other existing license conditions, for example HCGS license condition 2.C.6, Fuel Storage and Handling:

2.C.6, Fuel Storage and Handling (Section 9.1, SSER No. 5)

- a. No more than a total of three (3) fuel assemblies shall be out of approved shipping containers, NRC-approved dry spent fuel storage systems, fuel assembly storage racks or the reactor at any one time.*
- b. The above three (3) fuel assemblies as a group shall maintain a minimum edge-to-edge spacing of twelve (12) inches from the shipping container array and the storage rack array*
- c. Fresh Fuel assemblies, when stored in their shipping containers, shall be stacked no more than three (3) containers high.*

Additional Proposed Changes to the HCGS Facility Operating License

FOL Section

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- h. actions to be taken if acceptance criteria are not satisfied; and
- i. verification of the completion of commitments and planned actions specified in its application and all supplements to the application in support of the EPU license amendment request pertaining to the steam dryer prior to power increase above 3339 MWt.

PSEG Nuclear LLC shall provide the related EPU startup test procedure sections to the NRC staff prior to increasing power above 3339 MWt.

- 4. The following key attributes of the program for verifying the continued structural integrity of the steam dryer shall not be made less restrictive without prior NRC approval:
 - a. During initial power ascension testing above CLTP, each test plateau increment shall be approximately 5 percent of 3339 MWt;
 - b. Level 1 performance criteria; and
 - c. The methodology for establishing the stress spectra used for the Level 1 and Level 2 performance criteria.

Changes to other aspects of the program for verifying the continued structural integrity of the steam dryer may be made in accordance with the guidance of NEI 99-04.

- 5. During the first scheduled refueling outage after Cycle 15 and during the first two scheduled refueling outages after reaching full EPU conditions, a visual inspection shall be conducted of all accessible, susceptible locations of the steam dryer in accordance with BWRVIP-139 inspection guidelines.
- 6. The results of the visual inspections of the steam dryer shall be reported to the NRC staff within 90 days following startup from the respective refueling outage. The results of the power ascension testing to verify the continued structural integrity of the steam dryer shall be submitted to the NRC staff in a report within 60 days following the completion of all Cycle 15 power ascension testing. A supplement shall be submitted within 60 days following the completion of all EPU power ascension testing.

(23) Irradiated GE14i fuel bundles shall be stored at least four feet from the wall of the Spent Fuel Pool.