

## **PROPRIETARY INFORMATION – WITHHOLD UNDER 10 CFR 2.390**

10 CFR 50.90

April 18, 2013

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

> Peach Bottom Atomic Power Station, Units 2 and 3 Renewed Facility Operating License Nos. DPR-44 and DPR-56 NRC Docket Nos. 50-277 and 50-278

- Subject: Response to Request for Additional Information License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks
- References: 1) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request - Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated November 3, 2011
  - Letter from J. D. Hughey (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Units 2 and 3 - Supplemental Information Needed for Acceptance of Requested Licensing Action RE: Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks (TAC NOS. ME7538 and ME7539)," dated December 14, 2011
  - Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request - Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated December 22, 2011

Attachment 2 transmitted herewith contains Proprietary Information. When separated from attachments, this document is decontrolled. U.S. Nuclear Regulatory Commission Response to Request for Additional Information License Amendment Request Spent Fuel Pool Rack Inserts April 18, 2013 Page 2

- 4) Letter from J. D. Hughey (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Units 2 and 3 - Request for Additional Information Regarding License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks (TAC NOS. ME7538 and ME7539)," dated March 12, 2012
- 5) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information - License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated April 4, 2012
- 6) Letter from R. B. Ennis (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Units 2 and 3 - Request for Additional Information Regarding License Amendment Request for Use of Neutron Absorbing Inserts in Spent Fuel Pool Storage Racks (TAC NOS. ME7538 and ME7539)," dated April 18, 2012
- 7) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information - License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated May 17, 2012
- Letter from R. B. Ennis (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Units 2 and 3 - Request for Additional Information Regarding License Amendment Request for Use of Neutron Absorbing Inserts in Spent Fuel Pool Storage Racks (TAC NOS. ME7538 and ME7539)," dated May 22, 2012
- 9) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information - License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated June 21, 2012
- E-Mail from R. B. Ennis (U.S. Nuclear Regulatory Commission) to T. R. Loomis (Exelon Generation Company, LLC), "Draft RAI - PBAPS SFP Rack Insert LAR (TACs ME7538 & ME7539)," dated July 12, 2012

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- 11) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information - License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated August 15, 2012
- 12) E-Mail from R. B. Ennis (U.S. Nuclear Regulatory Commission) to T. R. Loomis (Exelon Generation Company, LLC), "RE: Draft Revised RAI for Peach Bottom Spent Fuel Pool Rack Insert Amendment," dated November 12, 2012
- 13) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information - License Amendment Request for Use of Neutron Absorbing Inserts in Units 2 and 3 Spent Fuel Pool Storage Racks," dated November 13, 2012
- 14) E-mail from R. B. Ennis (U.S. Nuclear Regulatory Commission) to T. R. Loomis (Exelon Generation Company, LLC), "Draft RAI - Peach Bottom SFP Rack Insert Amendment Request (TACs ME7538 & 39)," dated March 4, 2013

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) requested a proposed change to modify the Technical Specifications (TS) to include the use of neutron absorbing spent fuel pool rack inserts for the purpose of criticality control in the spent fuel pools at Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. In References 2, 4, 6, 8, 10, and 12 the U.S. Nuclear Regulatory Commission requested additional information. References 3, 5, 7, 9, 11 and 13 were our responses to those requests, respectively. In Reference 14, the U.S. Nuclear Regulatory Commission requested additional information. As a result of discussions with the U.S. Nuclear Regulatory Commission staff, attached is our response to Request for Additional Information (RAI) 44. In addition, Attachment 4 contains updated Technical Specification pages.

Exelon has reviewed the information supporting a finding of no significant hazards consideration and the environmental consideration provided to the U.S. Nuclear Regulatory Commission 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. In addition, the additional information provided in this submittal does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

Attachment 2 (letter from C. F. Lamb (Global Nuclear Fuel) to T. Loomis (Exelon Nuclear), dated April 16, 2013) contains information proprietary to Global Nuclear Fuel. Global Nuclear Fuel requests that the document be withheld from public disclosure in accordance

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with 10 CFR 2.390(a)(4). Attachment 3 contains a non-proprietary version of the Global Nuclear Fuel document. An affidavit supporting this request is also contained in Attachment 3.

There are no regulatory commitments contained in this submittal.

Should you have any questions concerning this letter, please contact Tom Loomis at (610) 765-5510.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 18<sup>th</sup> of April 2013.

Respectfully,

D. B. Helper

David P. Helker Manager, Licensing and Regulatory Affairs Exelon Generation Company, LLC

Attachments: 1) Response to Request for Additional Information

- 2) GNF Response to RAI 44 Proprietary Version
- 3) GNF Response to RAI 44 Non-Proprietary Version and Affidavit
- 4) Updated Markup of Technical Specification Page 4.0-2 (Units 2 and 3)

cc: USNRC Region I, Regional Administrator USNRC Senior Resident Inspector, PBAPS USNRC Senior Project Manager, PBAPS R. R. Janati, Bureau of Radiation Protection S. T. Gray, State of Maryland

# **ATTACHMENT 1**

Response to Request for Additional Information

### Question 44:

PBAPS has proposed a two tier approach for crediting degraded Boraflex until the NETCO-SNAP-IN<sup>®</sup> rack inserts are installed. The second tier, i.e., the 'Restricted' tier, credits Boraflex with more than 50% degradation. To account for the potential relocation of Boraflex during a seismic event, PBAPS has proposed an additional burnup requirement past the point of peak reactivity for the 'Restricted' tier. The NRC staff requires additional information regarding the 'Restricted' tier. Please provide the following information:

- a) Provide the k<sub>eff</sub> of the Restricted storage cells both with and without the additional burnup requirement and with the Boraflex being credited.
- b) Provide the k<sub>eff</sub> of the Restricted storage cells both with and without the additional burnup requirement but without the Boraflex being credited.
- c) Provide a description of the Monte Carlo models that are being used to provide those estimations of  $k_{eff}$ . The description can be in reference to the model that was used for the 'Unrestricted' tier.

#### **Response:**

#### Response to RAI 44, Item "a" and "b"

The k<sub>eff</sub> values requested in parts a) and b) of the RAI are provided in Attachment 2. The k<sub>eff</sub> values for the case of "Without Burnup, Without Boraflex" have been provided in Attachment 2. This scenario does not represent a condition that would ever be expected to occur in the Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3 spent fuel pools. Substantial settling of the Boraflex panel material in response to a postulated earthquake is not anticipated as discussed in our response to RAI 25 which is contained in our June 21, 2012 response (ML12188A094) even for panels that have over 50% B-10 degradation. There are currently no panels that are projected to be over 50% B-10 degradation through the end of 2013. Also, this case assumes that all of the Boraflex instantaneously disappears from all panels in the spent fuel pool. In actuality, assuming that all Boraflex would disappear is not a credible event. Additionally, due to the tighter fit of the panels, assuming a seismic event that would result in the panels splitting and slipping over top of each other is also not a credible event as previously discussed in RAI 25.

The k<sub>eff</sub> information discussed in Attachment 2 is based upon the following requirements for the fuel bundles to qualify for storage in a Restricted storage cell:

- 1. The fuel type is GE14
- 2. The bundle average discharge burnup must be greater than 43 GWd/ST (47.4 GWd/MT)

The actual discharge nodal exposure burnup profiles for all Unit 3 GE14 fuel were reviewed. The analyses used for the development of Tables 1 and 2 of Attachment 2 are based upon modeling that conservatively bounds the actual fuel in the PBAPS spent fuel pool. All eligible GE14 bundles came from the discharge batches of PBAPS, Unit 3, Cycles 16, 17, and 18. The GE14 fuel discharged from PBAPS, Unit 3 Cycle 15 was also reviewed, but all of this fuel had discharge exposures less than that required for storage in Restricted cells.

### **Response to Request for Additional Information**

The minimum burnup limit listed above has been increased from the existing proposed License Conditions. This change will be reflected in the new proposed License Conditions (see updated proposed License Condition below). This increase was incorporated to provide additional criticality margin while still ensuring that sufficient fuel exists to be placed in Restricted cells to support a full core offload for PBAPS, Unit 3 during the fall 2013 refueling outage.

Details of the evaluation performed to support these calculations can be found in Attachment 2.

#### Response to RAI 44, Item "c"

The Monte Carlo models utilized to calculate the values presented in Tables 1 and 2 (Attachment 2) are described in Attachment 2 and Sections 4.2 and 5.2 of NEDO-33686, which was submitted as part of our June 21, 2012, RAI response (ML12188A094).

#### Modified Proposed License Condition 2.C(14).a.3 for PBAPS Unit 3

The following proposed license condition for Unit 3, originally provided in our November 13, 2012, RAI response (ML12319A230), is being revised to account for the higher burnup (47,400 megawatt days per metric ton):

3) For the period up to December 31, 2013, cells whose minimum panel Boron-10 areal density is between 0.014 grams per square centimeter and 0.0112 grams per square centimeter may be used as restricted cells. Restricted cells will only contain Peach Bottom Unit 3 GE14 fuel assemblies with an assembly average burnup of greater than 47,400 megawatt days per metric ton. The minimum panel Boron-10 areal density shall be evaluated by assuming that the panel areal density was initially equal to a value of 0.0235 grams per square centimeter.