

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

10 CFR 50.55a

May 25, 2022

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

Peach Bottom Atomic Power Station, Unit 2  
Subsequent Renewed Facility Operating License No. DPR-44  
NRC Docket No. 50-277

**Subject:** Response to Request for Additional Information - Proposed Relief Request  
Associated with Reactor Pressure Vessel N-16A Nozzle Repair

- References:** 1) Letter from J. Danna (U.S. Nuclear Regulatory Commission) to D. Rhoades (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Unit No. 2 - Approval of One-Time Alternative to Flaw Characterization and Removal Requirements for N-16A Nozzle (EPID L-2020-LLR-0144)," dated April 23, 2021 (ML21110A680)
- 2) Letter from D. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Proposed Relief Request Associated with Reactor Pressure Vessel N-16A Nozzle Repair," dated December 20, 2021 (ML22003A002)
- 3) Email from J. Paige (U.S. Nuclear Regulatory Commission) to T. Loomis (Constellation Energy Generation, LLC), "Peach Bottom - Formal RAI for Proposed Alternative I5R-14, Revision 1 (EPID L-2022-LLR-0006)," dated April 28, 2022 (ML22118A331)

In the Reference 2 letter, Constellation Energy Generation, LLC (CEG, formerly known as Exelon Generation Company, LLC) requested approval of a relief request associated with the repair of a 2-inch instrument line nozzle at penetration N-16A on the Reactor Pressure Vessel (RPV). A relief request concerning this nozzle repair was previously approved in the Reference 1 letter for one operating cycle. In the Reference 3 email, the U.S. Nuclear Regulatory Commission requested additional information. Attached is our response.

Attachment 1 ("Response to Request for Additional Information") contains information proprietary to Framatome Inc. (Framatome). Framatome requests that this document be withheld from public disclosure in accordance with 10 CFR 2.390(a)(4). Attachment 2 contains a non-proprietary version of this Framatome document. An affidavit supporting this request is contained in Attachment 3.

**Attachment 1 transmitted herewith contains Proprietary Information.  
When separated from Attachment 1, this document is decontrolled.**

Response to Request for Additional Information –  
Peach Bottom Atomic Power Station, Unit 2  
Proposed Relief Request Associated with the  
RPV N16-A Nozzle Repair  
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There are no commitments contained in this letter.

If you have any questions or require additional information, please contact Tom Loomis at 610-765-5510.

Respectfully,



David P. Helker  
Senior Manager – Licensing  
Constellation Energy Generation, LLC

Attachments: 1) Response to Request for Additional Information (Proprietary)  
2) Response to Request for Additional Information” (Non-Proprietary)  
3) Affidavit

cc: USNRC Region I, Regional Administrator  
USNRC Senior Resident Inspector, PBAPS  
USNRC Project Manager, PBAPS  
W. DeHass, Pennsylvania Bureau of Radiation Protection (w/o Attachments)

**ATTACHMENT 1**

**Response to Request for Additional Information (Proprietary)**

**ATTACHMENT 2**

**Response to Request for Additional Information (Non-Proprietary)**

**Question:**

1. Section 3.1 of Attachment 5 to the submittal discussed the capacity factors in terms of operating time per calendar time and the associated corrosion rates in terms of inch per year (ipy).
  - a. Discuss how the values for the corrosion rates (ipy) were obtained.
  - b. Provide the assumed capacity factor for Peach Bottom, Unit 2 during future operation.
  - c. Discuss the amount of metal loss in the RV bore where the nozzle is repaired at the end of 80 years (i.e., how much enlargement would occur in terms of inches of the RV bore as the result of general corrosion?).

**Response:**

- a. As discussed in Attachment 5 ("Corrosion Evaluation of the Peach Bottom Unit 2 N16-A Reactor Vessel Nozzle Modification," Framatome Document No. 51-9320932-002, Proprietary Version) of the relief request (Reference 1), the corrosion rates were obtained from Reference 5 ([ ]). This report has an operational corrosion rate and a higher rate for sedentary conditions. The corrosion rates from [ ] are based on tests performed with low alloy steel in contact with BWR water conditions and BWR steam conditions.
- b. The capacity factor is conservatively assumed to be [ ].
- c. A service duration of [ ] years is conservatively considered. This results in an enlargement of [ ].

**Question:**

2. Confirm that the design of the repaired nozzle accounts for all design basis loading conditions which could lead to nozzle ejection over the remaining life of the plant.

**Response:**

Yes, bounding transients based on the pressure and temperature ranges were selected. The [ ] transients that were analyzed are the following: [

], as contained in Attachment 1 ("Peach Bottom 2 N16A Instrument Nozzle Repair J-Groove One-Cycle Justification," Document Number 32-9321034-002 (Proprietary Version) of Reference 3). These are the transients that lead to the highest stress ranges, and they are controlling for the flaw evaluation.

**Question:**

3. Table 4-8 in Attachment 3 to the submittal provides the projected bounding transient cycles to 80 years for the calculation of the flaw in the original J-groove weld. Discuss whether the bounding cycles in Attachment 3 are consistent with the transient cycles report in the Peach Bottom license renewal application (ADAMS Accession ML18193A689). If the answer is no, provide justification.

**Response:**

The bounding cycles from Attachment 3 are consistent with the transient cycles report in the Peach Bottom License Renewal Application. Table 4.3.1-1 ("PBAPS Unit 2 80-Year Transient Cycle Projections") from the Peach Bottom Atomic Power Station, Units 2 and 3 Subsequent License Renewal Application (Reference 4) shows that the 80-year projected transient cycles are the same for both the as-left J-groove weld analysis and the Subsequent License Renewal Application.

**Question:**

4. Section 4.2.2 of Attachment 3 to the submittal provides information on the fracture material properties including adjusted reference nil-ductility temperature  $RT_{NDT}$  (ART) of the N16 water level instrumentation nozzle. Discuss whether the ART was calculated based on Regulatory Guide (RG) 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," and the neutron fluence value predicted to the end of 80 years of operation.

**Response:**

Neutron fluence values for 70 EFY conservatively bounds 80 years of operation for Peach Bottom Unit 2. 43.8<sup>0</sup> F is the 70 Effective Full Power Years (EFYs) ART of the N16 water level instrumentation nozzle location. This value was calculated using the method from Regulatory Guide 1.99, Revision 2.

**Question:**

5. Regarding the flaw growth evaluation in Attachment 3 to the submittal, what is the final crack size in the RV shell at the end of 80 years?

**Response**

The bounding crack tip position is presented in Table 6-15 of Attachment 3 ("Peach Bottom Unit 2 RV Instrument Nozzle N16A Repair As-Left J-Groove Weld Analysis," Framatome Document No. 32-9335342-000, Proprietary Version) of the Reference 1 relief request. At the end of 80 years operation in 2054, the final flaw size is [ ] inches. Additionally, it is important to note that this is a postulated flaw in the low alloy steel reactor vessel material.

**References:**

1. Letter from D. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Proposed Relief Request Associated with Reactor Pressure Vessel N-16A Nozzle Repair," dated December 20, 2021 (ML22003A002)
2. Letter from J. Danna (U.S. Nuclear Regulatory Commission) to D. Rhoades (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Unit No. 2 - Approval of One-Time Alternative to Flaw Characterization and Removal Requirements for N-16A Nozzle (EPID L-2020-LLR-0144)," dated April 23, 2021 (ML21110A680)
3. Letter from D. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Relief Request Associated with N-16A Reactor Pressure Vessel Instrument Nozzle Repairs – Submittal of Analyses," dated November 24, 2020 (ML20329A345)

4. Subsequent License Renewal Application, Peach Bottom Atomic Power Station, Units 2 and 3, July 2018 (ML18193A773)

**ATTACHMENT 3**

**Affidavit**



## A F F I D A V I T

1. My name is Gayle Elliott. I am Deputy Director, Licensing and Regulatory Affairs, for Framatome Inc. (Framatome) and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by Framatome to determine whether certain Framatome information is proprietary. I am familiar with the policies established by Framatome to ensure the proper application of these criteria.

3. I am familiar with the Framatome information contained in an attachment to a letter to U.S. Nuclear Regulatory Commission from Mr. David P. Helker, Peach Bottom Atomic Power Station, Unit 2, with Subject, "Response to a Request for Additional Information – Proposed Relief Request Associated with Reactor Pressure Vessel N-16A Nozzle Repair," dated May 2022 and referred to herein as "Document." Information contained in this Document has been classified by Framatome as proprietary in accordance with the policies established by Framatome for the control and protection of proprietary and confidential information.

4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by Framatome and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.

5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information."

6. The following criteria are customarily applied by Framatome to determine whether information should be classified as proprietary:

- (a) The information reveals details of Framatome's research and development plans and programs or their results.
- (b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.
- (c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for Framatome.
- (d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for Framatome in product optimization or marketability.
- (e) The information is vital to a competitive advantage held by Framatome, would be helpful to competitors to Framatome, and would likely cause substantial harm to the competitive position of Framatome.

The information in this Document is considered proprietary for the reasons set forth in paragraphs 6(d) and 6(e) above.

7. In accordance with Framatome's policies governing the protection and control of information, proprietary information contained in this Document has been made available, on a limited basis, to others outside Framatome only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. Framatome policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

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

Executed on: May 18, 2022.

**ELLIOTT Gayle** Digitally signed by ELLIOTT  
Gayle  
Date: 2022.05.18 09:27:37 -04'00'

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Gayle Elliott