

RS-18-067

10 CFR 50.54(f)

May 29, 2018

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

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

James A. FitzPatrick Nuclear Power Plant
Renewed Facility Operating License No. DPR-59
NRC Docket No. 50-333

Subject: Response to Request for Additional Information Regarding Generic Letter
2016-01

- References:
1. NRC Generic Letter 2016-01, "Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools," dated April 7, 2016 (ADAMS Accession No. ML16097A169)
 2. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Response to Generic Letter 2016-01," dated November 3, 2016 (ADAMS Accession No. ML16308A470)
 3. Letter from B. R. Sullivan (Entergy Nuclear Operations, Inc.) to U.S. NRC, "Response to Generic Letter 2016-01 – Monitoring of Neutron Absorbing Materials in Spent Fuel Pools," dated November 3, 2016 (ADAMS Accession No. ML16308A461)
 4. Letter from B. Purnell (U.S. NRC) to B. C. Hanson (Exelon Generation Company, LLC), "Calvert Cliffs Nuclear Power Plant, Unit 1; Clinton Power Station, Unit No. 1; James A. FitzPatrick Nuclear Power Plant; Nine Mile Point Nuclear Station, Units 1 and 2; and Three Mile Island Nuclear Station, Unit 1 – Request for Additional Information Regarding Generic Letter 2016-01, 'Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools' (CAC Nos. MF9450, MF9448, MF9440, MF9429, MF9428, and MF9414, EPID L-2016-LRC-0001)," dated October 27, 2017 (ADAMS Accession No. ML17285B196)

5. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Response to Request for Additional Information Regarding Generic Letter 2016-01," dated January 25, 2018 (ADAMS Accession No. ML18025A799)

On April 7, 2016, the NRC issued Generic Letter (GL) 2016-01, "Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools" (i.e., Reference 1), to address degradation of neutron-absorbing materials in wet storage systems for reactor fuel at power and non-power reactors. Responses to GL 2016-01 for the stations listed above were submitted to the NRC in References 2 and 3.

In Reference 4, the NRC requested additional information that is needed to complete the review. Exelon Generation Company, LLC's (EGC's) response (i.e., Reference 5) for Clinton Power Station (CPS) and James A. FitzPatrick Nuclear Power Plant (JAF) was deferred based on ongoing industry activities with NEI and EPRI to support development of an industry neutron-absorbing material (NAM) industry-wide aging management program and the development of a response that multiple licensees may be able to reference. Specifically, Reference 5 stated EGC's intent to provide a response for CPS and JAF by May 31, 2018, contingent upon completion of the aforementioned industry activities. Based on the results of these industry activities, EGC is providing the attached information in response to the NRC's Reference 4 request.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. Kenneth M. Nicely at (630) 657-2803.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 29th day of May 2018.

Respectfully,



Patrick R. Simpson
Manager – Licensing

Attachment: Response to Request for Additional Information

cc: NRC Regional Administrator – Region I
NRC Regional Administrator – Region III
Senior Resident Inspector – Clinton Power Station
Senior Resident Inspector – James A. FitzPatrick Nuclear Power Plant

ATTACHMENT
Response to Request for Additional Information

Clinton Power Station, Unit No. 1

CPS-RAI-1 (Generic RAI)

The licensee's November 3, 2016, letter states that CPS does not have a site-specific monitoring program. Instead, the licensee is relying on general industry operating experience as a surrogate for the condition of the Boral installed in the CPS spent fuel pool.

- a. Describe how industry operating experience bounds the condition of the Boral at CPS, thereby providing assurance that any degradation or deformation that may affect the Boral at CPS is identified.
- b. Discuss the criticality impact due to relevant material deformation identified in general industry operating experience, and how it can be accommodated by the nuclear criticality safety analysis of record for CPS without exceeding subcriticality requirements.

Response

Through its Nuclear Safety Culture, procedures, and processes, Exelon Generation Company, LLC (EGC) systematically and effectively collects, evaluates, and implements relevant internal and external operating experience (OE) in a timely manner. Issues emerging from the use of Boral in the spent fuel racks are monitored through the EGC OE Program and Corrective Action Program.

As indicated in the original Generic Letter response for Clinton Power Station (CPS), the site will continue to monitor industry OE related to Boral, which includes ongoing participation in the EPRI Neutron Absorber Users Group (NAUG) and its related programs (e.g., industry-wide learning aging management for neutron-absorbing material). Industry-wide, to date there have been no indications of a loss of Boral material of a nature that diminished the neutron-absorbing capability of the Boral (Reference 1). CPS follows the EPRI Water Chemistry Control Program and there have been no indications of a loss of Boral neutron-absorbing capabilities at a plant following the guidelines. In addition, to date there are no plant-specific operating conditions or rack attributes that would merit concern that the CPS spent fuel racks or SFP environment are not bounded by the industry-wide OE. Finally, Reference 2 documents that observed or foreseen degradation or deformation of the Boral has an insignificant impact on SFP criticality. The industry OE aligns with the CPS licensing basis.

The NAUG, through EPRI, is currently developing an industry-wide program/database to aid in monitoring indications of potential Boral degradation and deformation. Over 70,000 water chemistry data points have been collected to date, from over 30 SFPs, for this program. Surveillance data from 50 coupons across 25 SFPs has also been collected to date. The program, supported by EPRI NAUG and industry participants, is described in Reference 3 and includes insights and feedback received from numerous communications with the NRC. Relevant issues emerging from this industry effort will be monitored through the EGC OE Program and Corrective Action Program.

To date, the industry OE has revealed no instances of an impact on SFP criticality due to observed Boral deformation (e.g., blistering) or degradation (e.g., pitting). The NAUG, through

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EPRI, has recently completed a study (Reference 2) which analyzes the criticality impact of blisters and pits on Boral. Simulations were performed at unborated conditions (i.e., 0 ppm) to ensure applicability to BWRs such as CPS. The study results demonstrate that pitting and blistering, on a scale much larger than any that has been observed in the industry OE, has an insignificant impact on SFP criticality. Therefore, the SFP criticality safety analysis of record remains applicable.

James A. FitzPatrick Nuclear Power Plant

JAF-RAI-1 (Generic RAI)

Discuss the criticality impact due to the material deformation identified at JAF, and how it can be accommodated by the nuclear criticality safety analysis of record without exceeding subcriticality requirements.

Response

To date, the industry OE has revealed no instances of an impact on SFP criticality due to observed Boral deformation (e.g., blistering) or degradation (e.g., pitting). The NAUG, through EPRI, has recently completed a study (Reference 2) which analyzes the criticality impact of blisters and pits on Boral. Simulations were performed at unborated conditions (i.e., 0 ppm) to ensure applicability to BWRs such as James A. FitzPatrick. The study results demonstrate that pitting and blistering, on a scale much larger than any that has been observed in the industry OE, has an insignificant impact on SFP criticality. Therefore, the SFP criticality safety analysis of record remains applicable.

References

1. EPRI Report 1021052, "Overview of BORAL® Performance Based Upon Surveillance Coupon Measurements," dated December 2010
2. EPRI Report 3002013119, "Evaluation of the Impact of Neutron Absorber Material Blistering and Pitting on Spent Fuel Pool Reactivity," dated May 2018
3. EPRI Document 3002013122, "Roadmap for the Industrywide Learning Aging Management Program (i-LAMP) for Neutron Absorber Materials in Spent Fuel Pools," dated May 2018