UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 1, 2022

Mr. David P. Rhoades
Senior Vice President
Constellation Energy Generation, LLC
President and Chief Nuclear Officer
Constellation Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 1 – REVIEW OF REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM CAPSULE 83° TECHNICAL REPORT (EPID L-2021-LRO-0042)

Dear Mr. Rhoades:

By letter dated July 30, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21210A325), Exelon Generation Company, LLC (the licensee) submitted an evaluation of the testing results of reactor vessel material surveillance program Capsule 83° from Calvert Cliffs Nuclear Power Plant, Unit 1. The evaluation report is WCAP-18624-NP, "Analysis of Capsule 83° from the Calvert Cliffs, Unit 1, Reactor Vessel Radiation Surveillance Program," Revision 0, dated April 2021. Capsule 83° was removed at 35.97 effective full-power years (EFPYs) of operation, having received a neutron fluence of 3.82×10^{18} n/cm^2 (E > 1.0 MeV). On February 1, 2022 (ML22032A333), Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC.

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," require that nuclear power plants install and, at certain intervals, remove and analyze the changes in fracture toughness of the reactor vessel materials contained in the surveillance capsules. Irradiation surveillance of the reactor vessel is necessary to assure that the vessel material will maintain its fracture toughness throughout the service life of the plant. The surveillance capsule contains both dosimeters as well as archival material samples to be irradiated to levels comparable to those expected to be accrued by the reactor vessel at the end of its licensed period.

Paragraph IV.A of Appendix H to 10 CFR Part 50 specifies that a summary technical report for each capsule withdrawal and the associated test results must be submitted within 1 year of the date of capsule withdrawal, unless an extension is granted by the Director, Office of Nuclear Reactor Regulation. Capsule 83° was removed in February 2020. By letter dated August 10, 2020 (ML20223A257), the licensee requested to extend the submittal due date for the Calvert Cliffs, Unit 1, reactor vessel material surveillance program capsule technical report from 1 year after capsule withdrawal to approximately 1 year and 6 months after the capsule was withdrawn from the reactor vessel. By letter dated November 16, 2020 (ML20307A500), the U.S. Nuclear Regulatory Commission (NRC) staff approved the requested submittal due date extension to no later than August 26, 2021. Based on the submittal of WCAP-18624-NP, Revision 0, by letter

dated July 30, 2021, the NRC staff finds the licensee has fulfilled the reporting requirements of paragraph IV.A of 10 CFR Part 50, Appendix H.

Paragraph IV.B of Appendix H to 10 CFR Part 50 requires that capsule evaluation reports include all data specified by ASTM Standard Practice E185-82 and the results of all fracture toughness tests conducted on the surveillance capsule materials in both the unirradiated and irradiated condition. The NRC staff has performed its review of WCAP-18624-NP and has confirmed that the report includes all of the data and test results that are required by Paragraph IV. B of 10 CFR Part 50, Appendix H, and by ASTM Standard Practice E185-82.

In WCAP-18624-NP, Revision 0, the licensee stated that the transport calculations supporting the analysis of the fluence of Capsule 83° were carried out using the RAPTOR-M3G computer code. While RAPTOR-M3G has been reviewed and approved by the NRC staff for referencing in licensing applications via WCAP-18124-NP-A, "Fluence Determination with RAPTOR-M3G and FERRET" (ML18204A010), the licensee has not requested or been approved by the NRC to incorporate this methodology into the licensing basis for Calvert Cliffs, Unit 1. From the NRC staff's review of Appendix A of WCAP-18624-NP, "Validation of the Radiation Transport Models Based on Neutron Dosimetry Measurements," which compares the measured capsule dosimetry results with those of previously withdrawn capsules, the NRC finds that no safety significant issue is presented or implied by the results of the capsule surveillance report.

This statement should not be construed as NRC approval for use of RAPTOR-M3G as a method for evaluation for Calvert Cliffs, Unit 1. The use of RAPTOR-M3G would require appropriate incorporation of the methodology into the Calvert Cliffs, Unit 1 licensing basis. The licensee will be expected to incorporate the updated surveillance data into the next revision of the Calvert Cliffs, Unit 1, pressure-temperature limits report, as required by 10 CFR Part 50, Appendix G.

If you have any questions, please contact me at (301) 415-1474 or Jason.Paige@nrc.gov.

Sincerely,

/RA/

Jason Paige, Senior Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-317

cc: Listserv

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 1 – REVIEW OF REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM CAPSULE 83° TECHNICAL REPORT (EPID L-2021-LRO-0042) DATED JUNE 1, 2022

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