



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

October 26, 2021

Mr. David P. Rhoades
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO)
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2 -
SUPPLEMENTAL INFORMATION NEEDED FOR ACCEPTANCE OF
REQUESTED LICENSING ACTION RE: LICENSE AMENDMENT REQUEST
REGARDING TRANSITION TO GNF3 FUEL (EPID L-2021-LLA-0159)

Dear Mr. Rhoades:

By letter dated September 14, 2021 (Agencywide Document Access and Management System (ADAMS) Accession No. ML21257A420), Exelon Generation Company, LLC (EGC, the licensee) submitted a license amendment request for Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities). The proposed amendment would transition Quad Cities from Framatome ATRIUM 10XM fuel to GNF3 fuel and also include revising Technical Specifications (TS) 5.6.5, "Core Operating Limits Report," paragraph b, to add a report that supports the General Electric Standard Application for Reactor Fuel (GESTAR) analysis methodology. The proposed change would also include utilizing Framatome RODEX2A methodology with an additional thermal conductivity degradation penalty in mixed core thermal-mechanical calculations. Additionally, the proposed change would revise the alternative source term loss-of-coolant accident analysis to use a bounding core inventory. The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's acceptance review of this amendment request. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to complete its detailed technical review. The acceptance review is also intended to identify whether the application has any readily apparent information insufficiencies in its characterization of the regulatory requirements or the licensing basis of the plant.

Consistent with Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), an application for an amendment to a license (including the TSs) must fully describe the changes requested, and following as far as applicable, the form prescribed for original applications. Section 50.34 10 CFR addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

In order to make the application complete, the NRC staff requests that EGC supplement the application to address the information requested in the enclosure by November 8, 2021. This will enable the NRC staff to begin its detailed technical review. If the information responsive to the NRC staff's request is not received by the above date, the application will not be accepted

for review pursuant to 10 CFR 2.101, and the NRC will cease its activities associated with the application. If the application is subsequently accepted for review, you will be advised of any further information needed to support the staff's detailed technical review by separate correspondence.

The information requested and associated time frame in this letter were discussed with EGC on October 20, 2021.

If you have any questions, please contact me, at (301) 415-2934 or booma.venkataraman@nrc.gov.

Sincerely,

/RA/

Booma Venkataraman, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No(s). 50-254, 50-265

Enclosure:
Supplemental Information Needed

cc: Listserv

SUPPLEMENTAL INFORMATION NEEDED
FOR ACCEPTANCE OF REQUESTED LICENSING ACTION REGARDING LICENSE
AMENDMENT REQUEST REGARDING TRANSITION TO GNF3 FUEL
EXELON GENERATION COMPANY, LLC
QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2.
DOCKET NO(S). 50-254 AND 50-265

By application dated September 14, 2021, (Agencywide Document Access and Management System (ADAMS) Accession No. ML21257A420), Exelon Generation Company, LLC (EGC, or the licensee) submitted a license amendment request (LAR) with a proposed change that supports the transition from Framatome ATRIUM 10XM fuel to GNF3 fuel at Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities). The proposed change includes revising Technical Specifications (TS) 5.6.5, "Core Operating Limits Report [COLR]," paragraph b, to add a report that supports the General Electric Standard Application for Reactor Fuel (GESTAR) analysis methodology to the list of approved methods to be used in determining the core operating limits in the COLR. The licensee also plans to utilize Framatome RODEX2A methodology with an additional thermal conductivity degradation penalty in mixed core thermal-mechanical calculations. Additionally, in support of the proposed transition to GNF-3 fuel, EGC proposes to revise the alternative source term loss-of-coolant accident analysis to use a bounding core inventory.

During the U.S. Nuclear Regulatory Commission (NRC) staff's acceptance review of the requested license amendment, the NRC staff found the application insufficient and more information is needed to accept the application for review. The NRC staff concluded that the following items are necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed amendment.

Item 1

By application dated September 14, 2021, Exelon proposed to insert a reference to GNF Report NEDC-33930P, Revision 0, "GEXL98 Correlation for ATRIUM 10XM Fuel," dated February 2021 (NEDC-33930P) included in the application, and retain the remaining TS core operating Limits report (COLR) references in Section 5.6.5 of the Quad Cities TS. The references list already contains a reference to the General Electric Standard Application for Reactor Fuel (GESTAR-II), which is necessary, among other things, to perform cycle-specific analysis and determine parameter operating limits for the proposed Global Nuclear Fuel (GNF) GNF3 fuel bundle design.

While evaluating the acceptability of the LAR, the NRC staff reviewed the Quad Cities Updated Final Safety Analysis Report (UFSAR), Chapter 15, "Accident and Transient Analyses" (ADAMS Accession No. ML19319A941). Excepting (1) historical information; (2) radiological consequences analyses; and (3) Chapter 15.8, "Anticipated Transients Without SCRAM," the analyses described therein are based on General Electric and Framatome (AREVA) analytic methods.

In addition, the NRC staff also reviewed the most recent Quad Cities COLRs. The Unit 1, Cycle 27, report reflects that the current Unit 1 core is comprised entirely of Framatome fuel (ADAMS Accession No. ML21090A153). The Unit 2, Cycle 26, report states that "...some legacy analyses by Westinghouse are still applicable for OPTIMA2 fuel as described in Reference 2" (ADAMS Accession No. ML20112F148). Based on this statement, the NRC staff infers that this coresident fuel will be removed in an upcoming cycle.

Therefore, both the COLR and the UFSAR reflect safety analyses that are performed using both the existing, Framatome fuel, and the proposed, General Electric fuel. 10 CFR 50.36(b) requires that the TSs shall be derived from the safety analysis report. In addition, the definition of the COLR in Section 1.1 of the Quad Cities

The TSs reflects the enabling language contained in NRC Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications" (ADAMS Accession No. ML031130447) stating in part, "These cycle-specific limits shall be determined for each reload cycle in accordance with Specification 5.6.5."

As it appears that the Westinghouse methods will no longer be in use to determine cycle-specific core operating limits, and are not included in the UFSAR, their retention in the TS is inappropriate. Please update the proposed TS revisions pages to reflect consistency with the UFSAR, the current and upcoming Quad Cities core designs, 10 CFR 50.36(b) requirements, and the guidance provided in GL 88-16, by removing references that will be unused and inapplicable, specifically those intended for use with Westinghouse fuel designs.

Item 2

The NRC staff has reviewed Section 3.4 of the LAR and concluded that necessary analysis/calculations to update the Environmental Qualification (EQ) documentation has not been updated as a result of the revised dose. As the EQ documentation is not complete, it's not clear to the NRC staff how the licensee can:

- (1) draw a conclusion that the EQ equipment is not adversely impacted and,
- (2) demonstrate that they continue to comply with 10 CFR 50.49.

Please discuss the technical basis for the EQ conclusions in the LAR.

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 DATED OCTOBER 26, 2021

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ADAMS Accession No. ML21294A003

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