

**From:** Wiebe, Joel  
**Sent:** Wednesday, July 21, 2021 4:31 PM  
**To:** Lisa Simpson (Lisa.Simpson@exeloncorp.com)  
**Cc:** Haskell, Russell  
**Subject:** Final Byron PDTS Second Round RAI  
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REQUEST FOR ADDITIONAL INFORMATION  
RELATED TO LICENSE AMENDMENT REQUEST FOR  
CHANGES TO THE BYRON NUCLEAR GENERATING STATION  
PERMANENTLY DEFUELED TECHNICAL SPECIFICATIONS  
EXELON GENERATION COMPANY, LLC  
BYRON NUCLEAR GENERATING STATION UNITS 1 AND 2  
DOCKET NO. 50-454 AND 50-455

By letter dated September 2, 2020, (Agencywide Documents Access and Management System Accession Number (ADAMS) ML20246G613) Exelon Generation Company, LLC. (Exelon), provided formal notification to the U.S. Nuclear Regulatory Commission (NRC) of its plans to permanently cease power operations to Renewed Facility Operating License (RFOL) Nos. NPF-37 and NPF-66 for Byron Nuclear Power Station, Units 1 and 2 (Byron) by September 30, 2021.

By application dated October 29, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20304A147), Exelon Generation Company, LLC (Exelon or the licensee), submitted an amendment to revise the Byron RFOLs and associated Technical Specifications to Permanently Defueled Technical Specifications (PDTS) consistent with the permanent cessation of reactor operation and permanent defueling of the reactor.

Previously approved License Amendment Nos. 147 to NPF-37 and 147 to NPF-66, "Byron Station, Unit Nos. 1 and 2, and Braidwood Station, Unit Nos. 1 and 2 - Issuance of Amendments RE: Alternative Source Term (TAC NOS. MC6221, MC6222, MC6223, AND MC6224)" dated September 8, 2006 (ADAMS Accession No. ML062340420), to adopt full implementation of the Alternative Source Term (AST) methodology.

By letter dated March 16, 2021 (ADAMS Accession No. ML21075A308) the licensee responded to the staff's requests for additional information. The staff reviewed the responses and on June 29, 2021 held a clarification call with the licensee to discuss the submittal.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is required to enable the NRC staff to make an independent assessment regarding its technical review.

**Regulatory Basis/Issue: New Fuel Handling Accident Analysis**

Regulatory Guide 1.183, "*Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors*," Rev. 0, July 2000 provides a methodology for analyzing the radiological consequences of several design-basis accidents (DBAs) to show compliance with 10 CFR 50.67. Regulatory Guide 1.183 provides guidance to licensees on acceptable application of alternate source term (AST) submittals, including acceptable radiological analysis assumptions for use in conjunction with the accepted AST.

NUREG-0800, "*Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition*," (SRP) Section 15.0.1, "*Radiological*

*Consequence Analyses Using Alternative Source Terms,”* Rev. 0, July 2000 provides review guidance to the staff for the review of alternative source term amendment requests. Section 15.0.1 states that the NRC reviewer should evaluate the proposed change against the guidance in RG 1.183. The dose acceptance criteria for the fuel handling accident (FHA) are a Total Effective Dose Equivalent (TEDE) of 6.3 rem at the exclusion area boundary (EAB) for the worst 2 hours, 6.3 rem at the outer boundary of the low population zone (LPZ), and 5 rem in the control room for the duration of the accident.

### **Staff Requests**

In its letter dated March 16, 2021, the licensee provided information on the new FHA analysis for the permanently defueled condition. The staff has the following requests for information based on the information provided.

RAI-1a. The licensee indicates in its March 16, 2021, letter that it used RADTRAD to calculate the FHA dose analysis. The input to RADTRAD is typically the core or assembly source term and Table 1 of the March 16, 2021, letter states that Table 2 provides the “Isotopic Core Inventory (Ci/MWt).” In addition, the paragraph directly above Table 2 indicates that it is a fuel source term (instead of the quantity of radioactive material that escapes the pool following an accident). However, in the clarification call the licensee indicated that Table 2 did not provide a core source term and instead provided the source term for the quantity of radioactive material that escapes the spent fuel pool following a fuel handling accident, including credit for the spent fuel pool water decontamination and other adjustments to radionuclide release fractions. Therefore, the March 16, 2021, letter does not clearly describe the Table 2 source term.

Request: Provide a clear description of the Table 2 source term, including a description of what the source term represents and how it was developed. Provide the relevant assumptions and parameters used in developing the source term and describe how the source term should be applied in a RADTRAD calculation. Clearly indicate which inputs were applied within the source term (i.e. the inputs used to create Table 2) and which inputs are applied in the RADTRAD calculation.

RAI-1b. UFSAR section 15.7-6 discusses the Byron Fuel Handling Accident. Table 15.7-6 provides the bounding isotopic core inventory for the fuel handling accident.

Request: Provide an updated Table 15.7-6 source term used to support the new fuel handling accident radiological consequence analysis.