

## NRR-DMPSPeM Resource

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**From:** Lamb, John  
**Sent:** Thursday, January 24, 2019 1:29 PM  
**To:** 'david.helker@exeloncorp.com'  
**Cc:** Richard.Gropp@exeloncorp.com; Bonnett, Frederick Paul:(GenCo-Nuc); Dostal, Jeffrey Paul:(GenCo-Nuc)  
**Subject:** For Your Action - RAI for Oyster Creek EP Exemption (Change to Adiabatic Heat-Up Calculation) (EPID: L-2018-LLA-0305)  
  
**Importance:** High

Dear Mr. Helker:

By letter dated October 22, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18295A384), Exelon Generation Company (Exelon) requested a change in the effective date of License Amendment No. 294, "Oyster Creek Nuclear Generating Station - Issuance of Amendment Re: Changes to The Emergency Plan for Permanently Defueled Emergency Plan and Emergency Action Level Scheme (CAC NO. MG0160; EPID L-2017-LLA-0307)" (ADAMS Accession No. ML18221A400), from 12 months (365 days) to 9.38 months (285 days) after permanent cessation of power operations. However, the exemptions from emergency planning requirements in 10 CFR 50.47, "Emergency plans," and Appendix E to 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities" (ADAMS Accession No. ML18220A980) necessary for implementation of License Amendment No. 294 included the effective date as an integral part of the exemption. Therefore, by letter dated November 6, 2018, Exelon supplemented the request dated October 22, 2018, with a request to modify the effective date of the exemption to 9.38 months (285 days) after permanent cessation of power operations.

By letter dated September 25, 2018, (ML18268A258), Exelon certified the permanent cessation of power operations at OCNCS on September 17, 2018, and permanent removal of all fuel from the reactor vessel as of September 25, 2018. Thus, the effect of the request would be to change the implementation date of the emergency plan changes approved in License Amendment No. 294 from September 17, 2019, to June 29, 2019.

The enclosure to this email provides the request for additional information (RAI). On January 22, 2019, the draft RAI questions were sent to Mr. Richard Gropp, and Mr. Paul Bonnet of your staff to ensure that they were understandable, the regulatory bases for the questions were clear, and to determine if the information was previously docketed. A teleconference was held on January 24, 2019, with Mr. Paul Bonnet and Mr. Richard Gropp of your staff to clarify the RAI questions. Exelon stated they would respond to the RAI within 30 days of the date of this email.

If you have any questions, please contact me at 301-415-3100 or via e-mail at [John.Lamb@nrc.gov](mailto:John.Lamb@nrc.gov).

Sincerely,

John G. Lamb, Senior Project Manager  
Special Projects and Process Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure:  
Request for Additional Information

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**ENCLOSURE**

**REQUEST FOR ADDITIONAL INFORMATION (RAI)**

**REQUEST FOR ADDITIONAL INFORMATION**  
**RELATED TO EXEMPTION REQUEST FOR**  
**THE OYSTER CREEK NUCLEAR GENERATING STATION**  
**EMERGENCY PLAN**  
**(CHANGE TO THE ADIABATIC HEAT-UP CALCULATION)**  
**EXELON GENERATION COMPANY, LLC**  
**OYSTER CREEK NUCLEAR GENERATING STATION**  
**DOCKET NO. 50-219**

By letter dated October 22, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18295A384), Exelon Generation Company (Exelon) requested a change in the effective date of License Amendment No. 294, "Oyster Creek Nuclear Generating Station - Issuance of Amendment Re: Changes to The Emergency Plan for Permanently Defueled Emergency Plan and Emergency Action Level Scheme (CAC NO. MG0160; EPID L-2017-LLA-0307)" (ADAMS Accession No. ML18221A400), from 12 months (365 days) to 9.38 months (285 days) after permanent cessation of power operations. However, the exemptions from emergency planning requirements in 10 CFR 50.47, "Emergency plans," and Appendix E to 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities" (ADAMS Accession No. ML18220A980) necessary for implementation of License Amendment No. 294 included the effective date as an integral part of the exemption. Therefore, by letter dated November 6, 2018, Exelon supplemented the request dated October 22, 2018, with a request to modify the effective date of the exemption to 9.38 months (285 days) after permanent cessation of power operations.

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**Applicable Regulation and Guidance**

The current 10 CFR 50 regulatory requirements for emergency planning, developed for operating reactors, ensure protection of the health and safety of the public. However, once a power plant is permanently shutdown and defueled, some of these requirements exceed what is necessary to protect the health and safety of the public. Therefore, pursuant to 10 CFR 50.12 "Specific Exemptions", Exelon requested exemptions from certain emergency planning regulations in 10 CFR 50.47 and 10 CFR Part 50, Appendix E, for the Oyster Creek Nuclear Generation Station (OCNGS).

The NRC staff reviewed this previously granted exemption from certain emergency plan requirements of 10 CFR Part 50 using the guidance provided in Interim Staff Guidance (ISG) NSIR/DPR-ISG-02, "Emergency Planning Exemption requests for Decommissioning Nuclear Power Plants" (ADAMS Accession No. ML14106A057). This guidance notes that the provisions of 10 CFR 50.12 permit the NRC to grant exemptions from the requirements of 10 CFR Part 50 regulations in circumstances where the application of the regulation is not necessary to achieve the underlying purpose of the rule. The staff concluded that a minimum of 10 hours would provide adequate time to initiate mitigative actions to cool the fuel or, if needed, for offsite authorities to implement protective actions using a comprehensive emergency management plan (CEMP) approach. Thus, a formal offsite radiological emergency plan would not be necessary for permanently shutdown and defueled nuclear power reactor licensees when at least 10 hours would be necessary for the fuel to heat-up to the cladding ignition temperature following a complete loss of coolant. The decay heat rate is an important parameter in determining the time available to initiate mitigative actions or offsite protective actions, and the limiting decay heat rate is determined by the fuel power history and the time after permanent cessation of power operations.

### Issue

Attachment 2 to Exelon's submittal dated October 22, 2018, contains Revision 1 to the Oyster Creek Nuclear Generating Station Zirconium Fire Analysis for Drained Spent Fuel Pool, C-1302-226-E310-457. The revision changed the decay heat rate used in the analysis to one specifically based on the final operating cycle power history rather than a projected bounding decay heat rate and increased the assumed heat sinks by including additional hardware masses (such as channel box and upper and lower tie plates). The analysis credited this additional heat sink capacity and revised decay heat rate to show that a 10 hour heat up time to the ignition temperature (900°C) would be available with a 9.38 month decay time.

The NRC staff found that the document does not adequately justify an assumption used in the analysis that all fuel components heat up at a uniform rate (Assumption 3.6). This assumption is present in the analysis because the heat-up time was calculated by dividing the product of the temperature change and the fuel assembly heat capacity (including the heat capacity of the added fuel assembly components) by the decay heat rate. However, the temperature of the upper and lower tie plates may differ significantly from other fuel assembly components because distance and complex design slow heat transfer via conduction, these components have a poor view factor for radiative heat transfer, and significant convective heat transfer is inconsistent with the adiabatic heat-up assumption. While it is common to assume components within an adiabatic envelope are at the same temperature, this assumption must be justified or the envelope boundary should be moved to ensure the assumption is valid.

### Request for Additional Information

Provide justification that all components within the assumed adiabatic envelope that have not been previously accepted (specifically, the channel box and upper and lower tie plates) heat-up uniformly with the fuel pellets and cladding in the active fuel region. The justification should consider the complex design of the fuel assembly, the heat transfer mode, and the maximum rate of heat transfer supported by the fuel assembly design in that heat transfer mode relative to the heat capacity of the component.

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**Mail Envelope Properties** (John.Lamb@nrc.gov20190124132800)

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**From:** Lamb, John

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