

From: [Tobin, Jennifer](#)
To: [Helker, David P:\(Exelon Nuclear\)](#)
Cc: [Gropp Jr, Richard W:\(Exelon Nuclear\)](#)
Subject: Peach Bottom Units 2 and 3 - Request for Additional Information - TSTF-505 (EPID L-2019-LLA-0120)
Date: Tuesday, January 12, 2021 8:50:00 AM

Dear Mr. Helker,

By application dated May 29, 2020, Exelon Generation Company, LLC (the licensee) submitted a license amendment request (LAR) for Peach Bottom Atomic Power Station, Units 2 and 3 (Peach Bottom) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20150A007). The proposed amendment would modify TS requirements to permit the use of Risk Informed Completion Times (RICT) in accordance with TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times - RITSTF Initiative 4b," (ADAMS Accession No. ML18183A493). A model safety evaluation was provided by the NRC to the TSTF on November 21, 2018 (ADAMS Accession No. ML18253A085).

The Nuclear Regulatory Commission's (NRC) staff is reviewing your submittal and has determined that additional information is needed to complete its review. The specific requests for additional information (RAI) questions are provided below.

A clarification call was held January 8th and resulted in clarification of the scope for RAI #1. Additionally, a one week extension for the response was requested and granted. The response for these two RAIs is due February 5, 2021.

If you have questions please don't hesitate to contact me.

Thanks!
-Jenny

RAI #1

The Nuclear Energy Institute (NEI) Topical Report NEI 06-09, Revision 0-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines, Industry Guidance Document," dated November 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML122860402) (hereafter NEI 06-09-A), and the U.S. Nuclear Regulatory Commission (NRC) Final Safety Evaluation for NEI 06-09-A, dated May 17, 2007 (ADAMS Accession No. ML071200238), specify that the license amendment request (LAR) should identify key assumptions and sources of uncertainty and should assess/disposition each as to its impact on the RMTS application.

Section 2.3.4 of NEI 06-09-A states that sensitivity studies should be performed on the base probabilistic risk assessment (PRA) model prior to initial implementation of the RMTS program on uncertainties that could potentially impact the results of a risk-informed completion time (RICT) calculation. NEI 06-09-A also states that the insights from the sensitivity studies should be used to develop appropriate risk management actions (RMAs), including highlighting risk-significant operator actions, confirming availability and operability of important standby equipment, and assessing the presence of severe or unusual environmental conditions. Uncertainty exists in the PRA modeling of Flexible Mitigation Strategies (FLEX) related to the equipment failure probabilities for FLEX equipment used in the model, the corresponding operator actions, and pre-initiator failure probabilities. Therefore, FLEX modeling assumptions can be key assumptions and sources of uncertainty for the RICTs proposed in this application.

In response to a question raised during the regulatory audit held on November 9, 2020 (APLA audit Question 05), the licensee provided in the LAR supplement dated December 2, 2020, (ADAMS Accession No. ML20337A301) sensitivity study results in Table 5.b.ii-2 that estimated the RICTs for increased FLEX equipment failure rates and individual and combined FLEX human error probabilities (HEPs). In this sensitivity study, the licensee used the 95th percentile values for the individual and combined FLEX HEPs to provide bounding realistic estimates, which seems appropriate. The licensee concluded in the response that the RICT is not sensitive to the uncertainties associated with FLEX equipment failure rates and FLEX HEPs, and based on the results of the sensitivity study, no specific global RMAs were identified related to FLEX operator actions. However, the NRC staff notes that the sensitivity study results in Table 5.b.ii-2 show significant decreases in RICT times of 43 and 20 percent for Technical Specifications (TS) limiting conditions for operation (LCOs) 3.8.1.D (inoperability of two or more offsite AC power circuits) and 3.8.1.E (inoperability of one offsite AC power circuit and one emergency diesel generator), respectively. Therefore, the basis for the licensee's conclusion regarding this sensitivity study is unclear. Given the significant impact on RICTs regarding TS LCOs 3.8.1.D and 3.8.1.E, it is unclear to the NRC staff how the source of uncertainty associated with FLEX HEPs will be addressed in the RMTS program for these LCOs. The NRC staff notes that the sensitivity study does not address the other proposed RICT TS LCOs and plant configurations with multiple LCO entries; therefore, it is unclear what the impact of this uncertainty is on the remaining proposed RICT TS LCOs and how this uncertainty will be addressed in the RMTS program for these LCOs.

Furthermore, part (b)(ii)(1) of the response to APLA audit Question 05 states that methods provided in Electric Power Research Institute (EPRI) Report 3002013018, "Human Reliability Analysis (HRA) for Diverse and Flexible Mitigation Strategies (FLEX) and Use of Portable Equipment: Examples and Guidance," dated November 2018, were used to analyze the transportation of portable equipment, installation of equipment, and routing of hoses and cables. It is noted that this EPRI report is not approved by the NRC staff. Also, the response identifies for two FLEX human failure events that multiple executable operator actions were analyzed as a single surrogate value instead of explicitly analyzing each action, which is not in accordance with accepted HRA methods. Therefore, the use of these methods appears to introduce additional uncertainty related to the credit for FLEX operator actions. In light of the above observations, provide the following information.

- a) Discuss whether the RICTs for other TS LCOs (i.e., those in scope of the RMTS program but not evaluated in Table 5.b.ii-2 of the LAR supplement) and for plant configurations involving more than one LCO entry are significantly impacted by FLEX HEP uncertainties. For those TS LCOs that are significantly impacted by this source of uncertainty, identify the LCOs and how this source of uncertainty impacts the RICT (e.g., describe and provide the results of a sensitivity study). Also, discuss the basis for the chosen plant configurations involving more than one LCO entry.
- b) For TS LCOs 3.8.1.D and 3.8.1.E, and other TS LCOs determined in part (a), above, to be significantly impacted by FLEX HEP uncertainties, address either (i) or (ii) below:
 - i. Describe how sources of uncertainty associated with FLEX HEPs will be addressed in the RMTS program. For those TS LCOs in LAR Enclosure 12 ("Risk Management Action Examples") and in the response to EEEB audit Question 05 ("RMA Examples") of the LAR supplement that are significantly impacted by FLEX HEP uncertainties (e.g., TS LCO 3.8.1.D in Section 4.1.3 of LAR Enclosure 12), provide updated RMAs that may be considered during a RICT Program entry to

minimize any potential adverse impact from FLEX HEP uncertainties, and explain how these RMAs are expected to reduce the risk associated with this source of uncertainty.

OR

ii. Provide a detailed justification that the sensitivities of the computed RICTs to FLEX HEP uncertainties do not need to be addressed in the RMTS program as required by Section 2.3.4 of NEI 06-09-A.

RAI #2

The Nuclear Energy Institute (NEI) Topical Report NEI 06-09, Revision 0-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines, Industry Guidance Document," dated November 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML122860402) (hereafter NEI 06-09-A), and the U.S. Nuclear Regulatory Commission (NRC) Final Safety Evaluation (SE) for NEI 06-09-A, dated May 17, 2007 (ADAMS Accession No. ML071200238), specify that the license amendment request (LAR) should identify key assumptions and sources of uncertainty and should assess/disposition each as to its impact on the RMTS application.

LAR Enclosure 9, Table E9-3, identifies the key assumptions and sources of uncertainty for the fire probabilistic risk assessment (PRA) and provides dispositions for each source of uncertainty for this application. The NRC staff reviewed the dispositions provided in LAR Table E9-3 to the key assumptions and sources of modeling uncertainty and noted that not all uncertainties that have the potential to impact the risk-informed completion time (RICT) calculations appeared to be appropriately dispositioned.

In LAR supplement dated December 2, 2020, the response to APLB audit Question 10.a provided results for the parametric uncertainty analysis for the fire PRA. The results show an increase in fire core damage frequency (CDF) of 5 percent for both Units 2 and 3, however, the increase in fire large early release frequency (LERF) was 31 and 40 percent for Units 2 and 3, respectively. The response stated that a relay panel in each unit, 20C032 and 30C032 respectively, were the significant contributors to the increase in fire LERF. When the fire scenarios associated with these components were removed from the analysis, the difference in fire LERF between the point estimate and mean was 10 and 4 percent, respectively, for Units 2 and 3. The response states that these scenarios are associated with fire-induced hot shorts, which result in spurious depressurization and valve closures. However, it is unclear to the NRC staff why the removal of these fire scenarios is appropriate in concluding that the epistemic uncertainty associated with the modeling of these scenarios (e.g., post-fire operator actions, spurious operation probabilities, etc.) does not impact the RICT proposed in the LAR. In light of these observations, provide the following information:

i. Justify why the epistemic uncertainty associated with the fire PRA LERF estimates does not significantly impact the RICT calculations proposed in the LAR (e.g., describe how the removal of the fire scenarios associated with relay panels 20C032 and 30C032 is appropriate for consideration of epistemic uncertainty and/or demonstrate that the use of fire PRA point estimates instead of the mean values does not impact the proposed RICTs).

ii. Alternatively to Part (i), explain what risk management actions (RMAs) will be incorporated into the RMTS program to minimize the potential adverse impact of the

epistemic uncertainty associated with the fire PRA LERF estimates. The explanation should address how any identified RMAs address the impact of this uncertainty.