From:	Marshall, Michael
To:	"Stewart, Glenn H:(GenCo-Nuc)"
Cc:	"Villar, Enrique:(GenCo-Nuc)"; James Danna (James.Danna@nrc.gov)
Subject:	CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2 - DRAFT REQUEST FOR ADDITIONAL INFORMATION REGARDING RISK-INFORMED TECHNICAL SPECIFICATION COMPLETION TIMES (CAC NOS. MF7415 AND MF7416; EPID L-2016-LLA-0001)
Date:	Tuesday, May 08, 2018 2:34:00 PM

Hello Glenn,

By letter dated February 25, 2016 (ADAMS Accession No. ML16060A223), as supplemented by letters dated April 3, 2017 (ADAMS Accession No. ML17094A591), January 11, 2018 (ADAMS Accession No. ML18011A665), and January 18, 2018 (ADAMS Accession No. ML18018B340), Exelon Generation Company, LLC (Exelon; licensee) submitted a License Amendment Request (LAR) proposing to modify the Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2 Technical Specification requirements to permit the use of risk-informed completion times.

The Nuclear Regulatory Commission (NRC) staff has determined that additional information is needed to complete its review of the request. The purpose of this e-mail is to provide a draft copy of the request for additional information (RAI) for your review to ensure that:

- the draft RAI questions are understandable,
- the bases for the questions are clear, and
- to determine whether the information being requested was previously docketed.

The draft RAI questions listed below are not a complete listing of the additional information needed to complete the NRC staff's review. Additional RAI questions were provided via separate correspondence. RAIs numbers 1 through 19 were sent to Exelon in letters dated November 13, 2017 (ADAMS Accession No. ML17304A941) and December 21, 2017 (ADAMS Accession No. ML17346A909).

If Exelon has any questions or comments concerning the clarity or basis for the RAI questions, please plan to share your questions or comments with the cognizant NRC staff at the public meeting scheduled for May 16, 2018 (ADAMS Accession No. ML18123A280). Additionally, be prepared to confirm that Exelon will be able to provide responses to the RAI questions within 30 days of the issuance of the final RAIs.

Draft RAIs

20. Enclosure 4 of the letter dated February 25, 2016, states that a total seismic core damage frequency (CDF) contribution of 1.1E-6/year and a seismic large early release frequency (LERF) contribution of 1.1E-7/year will be added to the configuration specific delta CDF and delta LERF from the internal events and fire initiating event contributions to estimate the risk-informed completion time. The LAR states that these seismic estimates are based on the re-evaluated seismic hazard for CCNPP performed in response to the Near-Term Task Force 2.1 (ADAMS Accession No. ML14099A196) and an estimated plant level high confidence of low probability of failure (HCLPF) of 0.27g peak ground acceleration (PGA) as used in the 2003 LAR entitled "Extension of Diesel Generator Required Action Completion Time" (ADAMS Accession No. ML031360410).

a. The staff notes that the CCNPP Expedited Seismic Evaluation Process Report (ESEP), submitted to the NRC on December 17, 2014 (ADAMS Accession No. ML14365A138), indicates that certain components, such as safety injection tanks, motor control centers, electrical buses, main control room panels, would fail in a seismic event through interaction with nearby block walls, and those components were assigned a lower HCLPF of 0.175 g due to the block wall lower capacity. This lower HCLPF could increase the seismic CDF and LERF estimates provided in the LAR.

   Justify the plant level HCLPF of 0.27 g PGA, given the noted block walls failures at 0.175 g indicated in the ESEP, or provide, with justification, updated seismic CDF and LERF estimates.

b. The 2003 LAR for extension of emergency diesel generator (EDG) completion times shows differences in estimated seismic CDF and LERF between Unit 1 and Unit 2. According to the NRC Technical Evaluation Report for the Individual Plant Examination for External Events, because the EDGs dedicated to Unit 2 are more dependent on service water cooling, which has a low fragility, the CDF value is higher for Unit 2 than for Unit 1.

   Explain and justify how the seismic CDF and LERF estimates apply to both units.

To estimate the seismic LERF, in the LAR assumes a 0.1 conditional large early release probability (CLERP) for seismic events, based on the internal events LERF to CDF ratio. The staff notes that a seismic event could lead to seismic-specific failures of structures, systems, and components, resulting in additional LERF sequences that are not in the internal events probabilistic risk assessment (PRA) model or potentially converting non-LERF sequences in the internal events PRA model to seismic LERF sequences. The LAR does not provide sufficient justification for the selected CLERP being able to capture or bound such considerations.

c. Explain why the containment is not expected to fail for seismic events and therefore would not noticeably affect the assumed 0.1 CLERP, and consequently, the seismic LERF estimate.

d. Identify other containment failure or bypass scenarios and discuss the impact of relatively frequent seismic events on these scenarios.

21. In RAI 10 (see letter dated November 13, 2017), the staff asked the licensee to explain how common cause failures (CCFs) are included in the PRA model and how the treatment of CCF either meets the guidance in Regulatory Guide (RG) 1.177, “An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications,” Revision 1 (ADAMS Accession No. ML100910008) or meets the intent of this guidance when quantifying a risk-informed completion time (RICT) for preventative maintenance for components from a CCF group of three or more components. The response to the RAI states that “common cause failures are modeled as separate basic events, with common cause combinations in the fault tree as different basic events.” The licensee further stated that the “common cause grouping is not dynamically changed when a component is removed from service for preventative maintenance” and that this is

appropriate because “the component, though not out of service for a reason subject to common cause failure, remains a participant in the common cause events for the remainder of the component operation.” It is unclear how the out of service component “remains a participant in the common cause events for the remainder of the component operation” and therefore it is unclear how the intent of RG 1.177 is met.

Please explain clearly how CCFs are modeled in the CCNPP PRA and justify why adjusting the common cause grouping is not necessary for preventative maintenance. In the explanation, include examples of fault trees for a CCF group of three components and the associated numerical results.

22. In RAI 11.a (see letter dated November 13, 2017), the staff requested the licensee to confirm and describe how the treatment of CCF in the case of emergent failures either meets the guidance in RG 1.177 or meets the intent of this guidance when quantifying a RICT. In response to RAI 11.a the licensee stated that risk management actions will be implemented. However in the response to RAI 11.b the licensee added the option to “numerically account for the increased possibility of CCF in the RICT calculation” to the text for the CCNPP Technical Specification Administrative Section 5.5.18, without further justification on how it meets the intent of the guidance in RG 1.177 requested in RAI 11.a.

    a. Explain how the task to “numerically account for the increased possibility of CCF in the RICT calculation” will be performed for emergent failures.

    b. Justify the treatment of CCF meets the intent of the guidance in RG 1.177.

23. In RAI 14 (see letter dated November 13, 2017), the staff requested explanation on how the containment spray and the containment cooling systems are modeled, and how a RICT based on CDF and LERF can be quantitatively determined for these systems. In response to RAI 14 the licensee stated that both systems are explicitly modeled in the PRA and that the PRA modeling “includes system components, such as pumps, valves and heat exchangers, and system dependencies, such as electrical and cooling water systems.“ The licensee further explained that the PRA success criteria is one of the two headers for the containment spray system, and two out of four air coolers for the containment air recirculation and cooling system. The licensee stated that these systems “can be numerally quantified for impact on CDF and LERF,” however did not explain how these systems impact core damage or large early release. Since the containment spray and containment cooling systems are generally related to the long-term release sequences (not large early release), it is not immediately clear to the NRC staff the impact that these systems have on the core damage and large early release in the licensee’s PRA model. Further, the iodine removal function of the containment spray system is not usually captured in the PRA.

    Explain and justify how these systems impact CDF and LERF.

24. In RAI 15 (see letter dated November 13, 2017), the staff provided wording for a proposed license condition, consistent with the license condition included in NRC-approved Amendment Nos. 188 and 171 for the pilot risk-informed completion time license amendment request (ADAMS Accession No. ML15127A669). In response, the licensee proposed the following text to be added to the CCNPP Technical Specification

Administrative Section 5.5.18:

a. *A RICT must be calculated using the PRA and non-PRA methods approved by the NRC, including internal events, internal floods, and fire PRA. Changes to these PRA and non-PRA methods require prior NRC approval. The PRA maintenance and upgrade process will validate that changes to the PRA models used in the RICT program follow the guidance in Appendix 1-A of ASME/ANS RA-Sa-2009, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications."*

b. *A report shall be submitted following each PRA upgrade and associated peer review, and prior to using the upgraded PRA to calculate a RICT. The report shall describe the scope of the upgrade.*

The license condition approved for the pilot contains both the terms “method” and “approach.” The license condition approved for the pilot would require prior NRC approval when:

- Switching from a non-PRA process, such as seismic margin analysis, to a seismic PRA, or vice-versa and

- Changing processes within a PRA model.

Describe, with examples, what constitutes a PRA and non-PRA methods that if changed, would require prior NRC approval.

Best Regards,
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