From:	Hayes, Barbara
To:	michaelp.gallagher@exeloncorp.com
Cc:	Drucker, David; Oesterle, Eric; Gibson, Lauren; Wilson, George; Beasley, Benjamin; Donoghue, Joseph; Hoffman, Robert; Martinez, Nancy; Ford, William; Folk, Kevin; Moser, Michelle; Rautzen, William; Grange, Briana; Rikhoff, Jeffrey; Young, Mitzi; Gamin, Kayla; Ranek, Nancy L.:(GenCo-Nuc)
Subject:	PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3, SUBSEQUENT LICENSE RENEWAL SEVERE ACCIDENT MITIGATION ALTERNATIVES REQUESTS FOR ADDITIONAL INFORMATION (EPID L-2018-RNW-0013)
Date:	Thursday, December 13, 2018 3:55:00 PM
Attachments:	

Dear Mr. Gallagher:
The U.S. Nuclear Regulatory Commission (NRC) is reviewing the Exelon Generation Company, LLC (Exelon) application for subsequent renewal of the operating licenses for Peach Bottom Atomic Power Station, Units 2 and 3 (Peach Bottom). As part of the environmental review, an audit related to severe accident mitigation alternatives (SAMA) was conducted via teleconference, by the NRC staff on November 13, 19 and 26, 2018. As a result of the audit and the NRC staff's review of the Peach Bottom environmental report, staff has identified areas where additional information is needed to complete the review. The enclosure lists the requests for information (RAIs) and the RAIs are also provided below. As requested by Nancy Ranek of your staff, your responses are expected no later than 45 days from the date of this email. If you have any questions, please contact me at 301-415-7442 or by e-mail at barbara.hayes@nrc.gov.
Sincerely,
Barbara Hayes, Project Manager
License Renewal Projects Branch
Division of Materials and License Renewal
Office of Nuclear Reactor Regulation
Docket Nos. 50-277 and 50-278
Enclosure: Request for Additional Information Regarding Severe Accident Mitigation Alternative (SAMA)
cc w/encl: Distribution via Listserv

OFFICE	PM: DMLR/MRPB	PM: DMLR/MRPB	BC: DMLR/MENB	BC: DMLR/MRPB	PM: DMLR/MRPB
NAME	Bhayes	DDrucker	BBeasley (JRikhoff for)	EOesterle	BHayes
DATE	12/10/18	12/10/2018	12/11 /2018	12/ 13 /2018	12/13/2018

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Enclosure PEACH BOTTOM NUCLEAR GENERATING UNITS 3 AND 4 (PEACH BOTTOM)
SUBSEQUENT LICENSE RENEWAL APPLICATION REVIEW
REGARDING SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA)

Request for Additional Information Basis

License renewal requirements are specified in 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." Licensees are required by 10 CFR 51.53(c), Postconstruction environmental reports, Operating license renewal stage, to submit an environmental report (ER) as part of the license renewal application (LRA). Review guidance for the staff is provided in NUREG–1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Supplement 1 – Operating License Renewal."

Peach Bottom provided a severe accident mitigation alternatives (SAMA) analysis in the environmental report (ER) for the 2001 initial License Renewal application. The applicant's ER for the 2018 subsequent license renewal application (SLRA) must contain any new and significant information of which the applicant is aware (10 CFR 51.53(c)(iv)) and the NRC Staff must consider whether such information affects prior generic environmental determinations, reflected in the Category 1 issues in Table B-1.
Section 51.41, "Requirement to submit environmental information" states:

> The Commission may require an applicant for a permit, license, or other form of permission, or amendment to or renewal of a permit, license or other form of permission, or a petitioner for rulemaking to submit such information to the Commission as may be useful in aiding the Commission in complying with section 102(2) of NEPA. The Commission will independently evaluate and be responsible for the reliability of any information which it uses.

Section 51.45, "Environmental report" states: "The environmental report should contain sufficient data to aid the Commission in its development of an independent analysis."
In the ER for the 2018 SLRA, Exelon indicated they followed the guidance in Nuclear Energy Institute (NEI) 17-04, "Model SLR New and Significant Assessment Approach for Severe Accident Mitigation Alternatives (SAMA),"

Revision 0, for providing SAMA new and significant information. Guidance in NEI 17-04 specifies, “Further documentation of the new and significant information review is listed in Section 3.5.2.” Furthermore, guidance in NEI 17-04 indicates, “Such documentation should be available to the NRC [U.S. Nuclear Regulatory Commission] either in the SLR [Subsequent License Renewal] ER (at the SLR applicant's discretion), or in supplemental information for review via E-document reading room, audit, and RAIs [requests for additional information].” Therefore, please provide responses to the following questions.

1. In order to confirm Peach Bottom’s consistency with the postulated accident conclusions in the 2013 Generic Environmental Impact Statement (GEIS), NRC staff need selected information from the Peach Bottom SAMA New and Significant basis document to be docketed. Specific information requested includes the following.
    a. Provide a summary of probabilistic risk assessment (PRA) revisions and the description of changes to the risk models since the 40-to-60-year initial LRA (Include a description of the changes made at the plant that have reduced or increased risk). Also, provide the current core damage frequency (CDF) and large early release frequency (LERF) of record for all applicable hazards.
    b. NEI 17-04 Section 3.1 “Data Collection” specifies that information elements that should be collected and identified as “new” information for the Stage 1 assessment include plant changes not yet incorporated into plant risk models. Are there any forthcoming model revisions and/or updated modeling techniques that may significantly impact the results of the SAMA evaluation?
    c. Identify and summarize examples of changes that have been implemented at Peach Bottom since the performance of the Peach Bottom SAMA analysis that are “risk-beneficial.”
    d. Describe any Peach Bottom power uprates and the impacts on risk at Peach Bottom. What was the change in CDF and LERF as a result of the extended power uprate, measurement uncertainty recapture and conversion to MELLLA+. Was the total change to CDF and LERF as a result of the uprates less than 30%?
    e. As provided in the updated 2013 GEIS, peak fuel burnup was considered new information. What is the estimated average peak fuel burnup at Peach Bottom during the subsequent period of extended operation?

2. Guidance in NEI 17-04 specifies,

“Without the insights of an updated Level 3 model and MB calculation, it is difficult to correlate specific changes to the CDF and Level 2 release categories to an averted cost-risk; therefore, in this stage of the analysis [Referring to the Stage 1 analysis], the approach is to bound the impact by demonstrating that SAMA implementation would not reduce the CDF or any of the Level 2 release category frequencies by 50 percent or more. If this can be demonstrated, it can be inferred that the SAMA’s averted cost-risk would not be more than 50 percent of the MB. This is because the averted cost-risk is directly tied to the changes in CDF and the Level 2 release category frequencies.”

Regarding Stage 1 of the analysis, guidance in NEI 17-04 clarifies:

“This step is similar to the Phase 1 screening process in NEI 05-01 with the exceptions that SAMAs are not eliminated due to excessive implementation cost (because an updated MB *(maximum benefit)* is not developed for the Stage 1 analysis) and SAMAs with very low benefits are not exempted from an explicit risk reduction assessment.”

Section 3.3 of NEI 17-04 describes the stage 2 process and states:

“If the Stage 1 analysis cannot definitively determine that all of the Unimplemented Phase 2 and Unscreened Industry SAMAs have averted cost-risk values that are less than 50% of the MB, it will be necessary to perform a more detailed averted cost-risk calculation for the “potentially significant” SAMAs. This requires an update of the Level 3 consequence model and recalculation of the averted cost-risk for each “potentially significant” SAMA using the latest plant risk models.”

    a. Describe the pre-screening criterion used to exclude any of the Peach Bottom Phase 2 SAMA candidates from further consideration, including the rationale for any deviations from the screening criteria provided in NEI 17-04. Specifically, justify the screening criterion named “Reclassified as a Phase 1 SAMA.” Was the maximum benefit updated for the Stage 1 analysis?

    b. Please clarify how the determination that SAMAs 3, 4, 5, 7, 8, 9, 10, 14, 16, 19, 20, 22, 23, 24, 25, 26, 28, and 29 were screened out in Stage 1 due to cost (exceeding the maximum benefit calculated in the original SAMA analysis) was performed. Were there any SAMAs determined to reduce the CDF or any of the Level 2 release category frequencies by 50 percent or more? Clarify how this screening approach is equivalent to the Stage 1 assessment described in NEI 17-04. If an equivalent process to Stage 1 is not used, please provide an explanation of the process by which they will be further considered/ evaluated by Exelon.

3. Guidance in NEI 17-04 Section 3.1 “Data Collection” specifies:

"Use the latest risk models that are available for internal events (including internal flooding) and for each of the external events contributors identified for evaluation in NEI 05-01 ["Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document," Revision A, November 2005]."

Guidance in NEI 05-01 specifies:

"The IPEEE [Individual Plant Examination of External Events] identified the highest risk externally initiated accident sequences and potential means of reducing the risk posed by those sequences. Typically, the following external events were evaluated:

- Internal fires
- Seismic events
- Other external events such as high wind events, external flooding, transportation and nearby facility accidents"

a. Explain how "Other external events such as high wind events, external flooding, transportation and nearby facility accidents" were considered in the Peach Bottom SAMA New and Significant Evaluation. Discuss recommendations to reduce risk due to each of these external events.

b. Were there any Peach Bottom or other facility external event SAMAs evaluated? If so, briefly describe. If not, indicate the reason why.

c. Information from the Peach Bottom Postulated Accidents New and Significant Review Document is needed for the NRC staff's evaluation as it relates to external events.
Table 3 of the Peach Bottom Postulated Accidents New and Significant Review Document lists the fire and seismic CDF estimates for Peach Bottom, as reported during 1990 and 2016. Please confirm the statement, "… the fire and seismic CDFs for PBAPS calculated in 2016, as well as the sum of the two, were less than 5.4E-5 per reactor-year, which was the internal events mean value CDF for all BWRs used in the 2013 GEIS to estimate probability-weighted, offsite consequences from airborne, surface water, and groundwater pathways, as well as the resulting economic impacts from such pathways."

4. Guidance in NEI 17-04 Section 3.1 "Data Collection" specifies:
"The following is one of the information elements that should be collected and identified as "new" information for the Stage 1 assessment:
For those plants that have not maintained a full level 2 model, it will be necessary to either update the Level 2 model or develop a process by which the relevant release category frequencies can be estimated for each SAMA considered to ensure the full spectrum of plant risk can be accounted for in the Stage 1 assessment."
Exelon developed a process by which the relevant release category frequencies can be estimated for each SAMA considered in the supporting documentation (Peach Bottom Postulated Accidents New and Significant Review document). Please provide justification for this new approach including how similar plants were chosen, how the seismic accident class frequencies are used to estimate the relevant Level 2 release category frequencies, how they are used in the Stage 1 assessment for the potential significance of new information, and how specific release categories were considered significant or insignificant. Please provide specific details regarding how the sum of the two release frequencies not exceeding 80% is equivalent to a release frequency of 50% in one release category. Also, provide details regarding how LaSalle (with a Mark 2) containment was considered equivalent in this alternative approach. Further, clarify if SAMAs with very low benefits were exempted from the risk reduction assessment.

5. The ER states, "Estimated population increase is within the range determined by the NRC in the 2013 GEIS to not be significant." Please summarize Exelon's evaluation of population.