



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 6, 2018

Mr. Michael Gallagher
Vice President, License Renewal
Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: LICENSE RENEWAL SEVERE ACCIDENT MITIGATION ALTERNATIVES
AUDIT PLAN REGARDING THE PEACH BOTTOM ATOMIC POWER STATION,
UNITS 2 AND 3, SUBSEQUENT LICENSE RENEWAL APPLICATION (EPID
NO. L-2018-RNW-0013)

Dear Mr. Gallagher:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing the Exelon Generating Company's subsequent license renewal application for Peach Bottom Atomic Power Station, Units 2 and 3 (Peach Bottom). The NRC staff plans to conduct an in-office audit of new and significant information related to the severe accident mitigation alternatives (SAMA), beginning November 13, 2018, by teleconference and virtual portal. The audit activities will be conducted in accordance with the audit plan provided at Enclosure 1. The list of audit questions is provided at Enclosure 2.

If you have any questions, please contact me by e-mail at David.Drucker@nrc.gov.

Sincerely,

/RA/

David M. Drucker, Senior Project Manager
License Renewal Project Branch
Division of Materials and License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

Enclosures:
As stated

cc w/encls: Listserv

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**LICENSE RENEWAL AUDIT PLAN FOR NEW AND SIGNIFICANT INFORMATION RELATED
TO THE SEVERE ACCIDENT MITIGATION ALTERNATIVES
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3**

1. Background

By letter dated July 10, 2018, Exelon Generating Company (Exelon or applicant), submitted to the U.S. Nuclear Regulatory Commission (NRC or staff) an application to renew the Peach Bottom Atomic Power Station, Units 2 and 3 (Peach Bottom), renewed facility operating licenses DPR-44 and DPR-56. The staff is reviewing the information contained in the environmental report (ER) of the subsequent license renewal application (SLRA) per Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51).

As part of the staff's review, a severe accident mitigation alternatives (SAMA) audit will be conducted for Peach Bottom's SLRA. This audit is conducted with the intent to gain understanding, to verify information, and to identify information that will require docketing to support the basis of the licensing or regulatory decision. Specifically, the NRC staff will identify pertinent SAMA information and data, and obtain clarifications regarding information provided in the ER.

Per NRC guidance, the NRC staff prepares a regulatory audit plan that provides a clear overview of audit activities and scope, team assignments, and schedule.

2. Audit Bases

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 54.23 to submit an ER that complies with the requirements in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," as part of the 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."

Section 51.53(c)(3)(ii)(L) of 10 CFR states that "If the staff has not previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement or in an environmental assessment, a consideration of alternatives to mitigate severe accidents must be provided." Peach Bottom provided a SAMA analysis in the 2001 ER for initial license renewal. The ER was reviewed by the NRC in 2003. Thus, the applicant's ER 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.

3. Audit Scope

The scope of the SAMA audit is to review the new and significant evaluation as it relates to the SAMA analysis and results as documented in the Peach Bottom SLRA ER and supporting documents.

4. Information and Other Material Necessary for the Audit

As described in the list of audit questions (Enclosure 2).

5. Team Assignments

Name	Responsibility
J. Dozier	Senior Reliability and Risk Analyst
E. Dickson	Physical Scientist
D. Drucker	Senior Project Manager
L.K. Gibson	Project Manager

6. Logistics

The regulatory audit will begin as an in-office (at NRC HQ) audit on November 13, 2018. Discussions between NRC staff and Exelon staff will be held regarding topics and questions identified in the attached list of audit questions. Staff will audit the requested information provided on the electronic document portal. Entrance and exit briefings will be held at the beginning and end of the in-office audit via conference calls. Status calls during the in-office (at NRC HQ) audit will occur at least weekly, more often if deemed necessary. An exit for this audit will be scheduled at a mutually agreed time for NRC staff and Exelon.

7. Special Requests

The NRC staff requests the applicant to make available the license renewal application program basis documentation and other documents as requested for independent searches by the NRC's audit team via the electronic document portal.

8. Deliverables

An audit summary report is scheduled to be issued by NRC staff within 90 days from the end of the audit.

LIST OF AUDIT QUESTIONS
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 (PEACH BOTTOM)
SUBSEQUENT LICENSE RENEWAL APPLICATION REVIEW
IN-OFFICE SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) AUDIT

November 13, 2018

Specific questions to be discussed during the audit:

1. In the Environmental Report (ER), Exelon indicated that it is following the guidance in Nuclear Energy Institute (NEI) 17-04, "Model SLR New and Significant Assessment Approach for SAMA," Revision 0, for providing SAMA new and significant information. NEI 17-04 specifies, "Further documentation of the new and significant information review is listed in Section 3.5.2." Furthermore 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]."

Specific additional documentation the staff needs to complete the review relating to SAMA new and significant information include:

- a. List of probabilistic risk assessment (PRA) revisions and the description of changes to the risk models since the 40-to-60-year license renewal application (LRA) (Include a discussion of the changes made at the plant that have reduced or increased risk).
- b. Description of current risk models (at a level of detail consistent with what was expected for the 40-to 60-year LRA). Also, provide the current CDF and LERF of record for all applicable risk models.
- c. The comprehensive list and disposition of the Peach Bottom candidate SAMAs and industry SAMAs applicable to Peach Bottom.
- d. The pre-screening criterion used to exclude any of the SAMA candidates from further consideration, including the rationale for any deviations from the screening criteria provided in NEI 17-04. Specifically, a new screening criterion was used named "Reclassified as a Phase 1 SAMA."
- e. The most recent Probabilistic Safety Analysis (PSA) Peer Review and/or self-assessment reports for all hazards.
- f. Documentation associated with more recent Peach Bottom PSA review.
- g. Any specific Peach Bottom references regarding Cost-Benefit Analysis.
- h. Identify how any Phase II SAMAs that were not potentially cost beneficial in the 40-to-60-year SAMA analysis will be further assessed. The discussion should include an explanation of the process by which they will be further considered/evaluated by the plant.

2. An applicant is required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 51.53(c)(3)(iv) to disclose new and significant information of environmental impacts of license renewal of which it is aware. NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan (with Supplement 1 for Operating Reactor License Renewal)," Supplement 1, March 2000, guides the reviewer as follows:

"Prepare the section for the SEIS [supplemental environmental impact statement] describing the search for new information, summarizing new information found, and presenting results of evaluation of significance."

Further NEI 17-04 Section 3.1 "Data Collection" specifies:

"An initial step of the assessment process is to identify the "new information" relevant to the SAMA analysis and to collect/develop those elements of information that will be used to support the assessment."

The new information should be specific to Peach Bottom. Please provide the specific information that was considered "new information" for Peach Bottom, including the information provided in NEI 17-04, Stage 1 Assessment "New Information" Elements.

3. 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]."

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"

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.

4. 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 (SAMA basis 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.

5. Was there any Peach Bottom or other facility external event SAMAs evaluated? If so, briefly describe. If not, indicate the reason why not.
6. 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 for plant changes? Also, are there updated modeling techniques that may significantly impact the results of the SAMA evaluation?
7. Identify or summarize changes that have been implemented at Peach Bottom since the performance of the Peach Bottom SAMA analysis that are "risk-beneficial."
8. Describe any Peach Bottom power uprates and impacts on risk at Peach Bottom. What was the change in CDF and LERF as a result of the EPU, MUR and conversion to MELLLA+. Were the changes to CDF and LERF less than 30%?
9. As provided in the updated 2013 GEIS, peak fuel burnup was considered new information. What is the peak fuel burnup at Peach Bottom?
10. The staff needs to confirm the new and significant information as it relates to external events.

Table 3 of the SAMA Basis Document lists the fire and seismic CDF estimates for PBAPS, as reported during 1990 and 2016. Please be prepared to discuss 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."

11. SAMA 1 was dispositioned not applicable by Exelon. This SAMA appears to be a

procedural enhancement and the Exelon disposition discusses design changes. Please clarify.

12. SAMAs 3, 4, 5, 7, 8, 9, 10, 14, 16, 19, 20, 22, 23, 24, 25, 26, 28, and 29 were screened in Phase 1 due to cost. Please clarify how this was performed in Stage 1 using the NEI 17-04 guidance. Were these SAMAs determined not to reduce the MB by 50 percent or more?
13. The ER states, "Estimated population increase is within the range determined by the NRC in the 2013 GEIS to be not significant." Please be prepared to discuss the Peach Bottom specific information for this determination.

Since additional information will be provided during the audit, other questions may be identified and discussed during the audit.