



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

August 31, 2018

Mr. Mano Nazar
President and Chief Nuclear Officer
Nuclear Division
Florida Power & Light Company
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SUBJECT: TURKEY POINT NUCLEAR GENERATING UNITS 3 AND 4 – SUMMARY OF
THE IN-OFFICE REGULATORY AUDIT REGARDING SEVERE ACCIDENT
MITIGATION ALTERNATIVES IN THE SUBSEQUENT LICENSE RENEWAL
APPLICATION (EPID NO. L-2018-LNE-0001)

Dear Mr. Nazar:

On July 5-13, 2018, staff from the U.S. Nuclear Regulatory Commission (NRC) participated in an in-office audit in Rockville, MD, related to the severe accident mitigation alternatives (SAMA) analysis in the subsequent license renewal application (SLRA) for the Turkey Point Nuclear Generating Units 3 and 4 (Turkey Point). The goal of this audit was to review analysis for new and significant information as it relates to the SAMA analysis and results as documented in the Turkey Point SLRA Environmental Report (ER) and gather information to ensure that the requirements of license renewal as codified in Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51) are met, in accordance with the issued audit plan (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18178A152). The enclosure is a list of representatives from NRC and personnel from Florida Power & Light Company (FPL), and its contractors who participated in the site audit.

The audit began on July 5, 2018, with an entrance meeting to introduce participants and to discuss logistics of the audit. Following the entrance meeting, the review team participated in discussions of Turkey Point, the application, and the evaluation for new and significant information relating to the SAMA analysis with FPL staff and its contractors.

At the conclusion of the in-office audit, the staff summarized the status of the review with FPL representatives during the exit meeting. The team's questions identified in the audit plan or during the audit (see attachment) were answered during the audit. At the exit, the team indicated that the SLRA review was ongoing and that any additional information necessary to support the review would be formally requested via the RAI process, during the course of the review.

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

Sincerely,

/RA/

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

Docket Nos. 50-250 and 50-251

Enclosures:

1. List of Participants
2. Listing of questions identified during the audit

cc: Listserv

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TURKEY POINT NUCLEAR GENERATING UNITS 3 AND 4
SUBSEQUENT LICENSE RENEWAL APPLICATION REVIEW
IN-OFFICE SEVERE ACCIDENT MITIGATION ALTERNATIVES AUDIT

July 5-13, 2018

PARTICIPANTS	ORGANIZATION
U.S. Nuclear Regulatory Commission (NRC)	
Lois M. James	Senior Project Manager, NRC
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Rick Orthen	FPL
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LIST OF AUDIT QUESTIONS
TURKEY POINT NUCLEAR GENERATING UNITS 3 AND 4 (TURKEY POINT)
SUBSEQUENT LICENSE RENEWAL APPLICATION REVIEW
IN-OFFICE SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) AUDIT

July 5-13, 2018

Specific questions discussed during the audit:

1. In the Environmental Report (ER), Florida Power and Light Company (FPL) 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 that, "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).
- c. The comprehensive list and disposition of the 339 candidate SAMAs (76 Turkey Point specific SAMAs and 263 industry SAMAs) cited in Section 4.15.4.2 of the Turkey Point ER.
- d. The pre-screening criterion used to exclude any of the Stage 1 SAMA candidates from further consideration, including if applicable, the rationale for excluding potentially cost beneficial SAMAs identified in U.S. license renewal applications after submittal of the SAMA analysis for the analyzed plant (i.e., industry SAMAs).
- e. The most recent Probabilistic Safety Analysis (PSA) Peer Review and/or self-assessment reports for all hazards.
- f. Documentation associated with more recent Turkey Point PSA reviews, particularly of the Level 2 and 3 PSAs.
- g. Turkey Point reference regarding Cost-Benefit Analysis of SAMA Analysis.
- h. Identify how any "new and significant" 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. Section 4.15 of the ER indicated that:

“The cost-benefit analysis included development of a Level 3 probabilistic risk assessment (PRA) for PTN [Turkey Point] Unit 3, which was used to calculate conditional offsite population doses and offsite economic consequences for each of the PRA source term categories (STCs). The analysis was developed for Unit 3 and applicable to the license renewal for both units (FPL 2000a).”

Were there any design changes that could make the Level 3 results different? Is the assumption of using the same analysis for both units still valid?

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 Turkey Point. Section 4.15.3.1.1 of the ER, “Definitions of New and Significant Information” provides general information regarding all plants that might be considered “New Information.” Please specify the information that was considered “new information” for Turkey Point, including the information specified 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 Turkey Point SAMA New and Significant Evaluation? Discuss recommendations to reduce risk due to each of these external events.

4. The ER provides that “Qualitative screening of each from further analysis resulted in elimination of all external event SAMAs in the PTN [Turkey Point] SLR.” Provide a justification for the discussed qualitative screening.

5. NEI 17-04 Section 3.1 “Data Collection” specifies:

“The following are 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.”

The ER specifies:

“However, the approach of evaluating every STC is not necessary to ensure the MB [maximum benefit] reduction is less than 50 percent. In reality, many individual STCs have a frequency that is insignificant, and while an insignificant STC could in theory be reduced by more than 50 percent; its impact on MB would be negligible. Therefore, for this analysis, STC groups (large early release frequency [LERF]; small early release frequency [SERF], etc.) were examined as a whole for percentage reduction. If no STC group frequency was reduced by more than 50 percent, then also the MB would not be reduced by more than 50 percent. Therefore, that SAMA would not be considered potentially significant and would not be evaluated further in assessing the significance of new information.”

Please provide a justification specific to Turkey Point demonstrating an insignificant case.

6. NEI 17-04 Section 3.1 “Data Collection” specifies: 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.

ER Section 4.15, Severe Accident Mitigation Alternatives Analysis, specifies:

“Over the course of plant operation, changes are made to the plant design, operation, and maintenance practices. Periodic updates to the PTN [Turkey Point] PRA have ensured that the PRA includes the relevant changes and continues to reflect the current plant design and operation. PRA updates also

include updates to the plant-specific initiating event and equipment data utilized, and improvements in state-of-the-art analysis of severe accidents.”

Are there any forthcoming model revisions and/or updated modeling techniques that may significantly impact the results of the SAMA evaluation?

7. The binning of SAMAs was performed in a manner that allowed bounding cases that completely addressed a plant risk contributor to be defined to estimate the maximum possible benefits for any of the grouped SAMAs. For example, all interfacing systems loss of coolant accident (ISLOCA)-related SAMAs could be represented by a single case in which all ISLOCA events are set to zero (i.e., the risk of an ISLOCA event was assumed to be completely eliminated by SAMA implementation). FPL states that this bounding approach ensured a conservative analysis, while limiting the total number of cases requiring more detailed evaluation. Contrast this approach with evaluating individual SAMAs. Clarify why the FPL approach is conservative.
8. In ER Table 4.15-1, “Quantitative Screening of SAMAs that were not Qualitatively Screened,” Case 9 regarding “Set instrument air compressor basic events to zero,” justify why Case 9 resulted in a 0.00 percent change in the risk reduction.
9. In ER Table 4.15-1, “Quantitative Screening of SAMAs that were not Qualitatively Screened,” Case 10 regarding “Add an independent containment spray pump,” justify why the INTACT and LERF cases resulted in a positive percent change.
10. On Page 18 of the FPL Turkey Point SAMA New and Significant Basis Document, Table 3, “Industry External Events SAMA Candidates,” indicates the following SAMAs were qualitatively screened because the SAMA is specific to the source plant and not Turkey Point:
 - Three Mile Island-1 Pre-stage severe external flooding equipment
 - Three Mile Island-1 Increase the flood protection height

Explain why these SAMAs were considered not applicable to Turkey Point.

11. Identify or summarize changes that have been implemented at Turkey Point since the performance of the Turkey Point SAMA analysis that are “risk-beneficial.”
12. On page A-6 of the FPL Turkey Point SAMA New and Significant Basis Document, (which was related to Braidwood 1 and 2 and Byron 1 and 2), the explanation for SAMA 25 indicates:

“Qualitatively screen, as this was >50 reduction in the Maximum Attainable Benefit (MAB) in the first license renewal SAMA and was not cost-beneficial”

Why was this not quantitatively evaluated at Turkey Point?

13. On page A-7 of the FPL Turkey Point SAMA New and Significant Basis Document, for Braidwood 1 and 2 SAMA 7, the explanation indicates: “Install kill switches for the fire protection pumps in the main control room (MCR) qualitatively screen, SAMA is specific to the source plant and not PTN [Turkey Point].” Why is this SAMA not relevant to Turkey Point?

14. In Table A-3 of the FPL Turkey Point SAMA New and Significant Basis Document, SAMA 9 specifies to "Provide additional SW pump." The assessment indicated, "Qualitatively screen based on screening criterion B since PTN [Turkey Point] has installed new low-leakage RCP [reactor coolant pump] seals." Please clarify.
15. In the FPL Turkey Point SAMA New and Significant Basis Document, SAMA 34 and SAMA 35 related to removing decay heat and were screened out due to the expected high cost of \$20M. Justify screening out these SAMAs.
16. In the original license renewal evaluation, SAMAs 50, 53 and 54 were >50 percent of the MAB but were not considered cost effective. Given that the benefit of SAMAs has increased due to increased factors that go into the calculation (such as the increase in \$/person-rem, etc.), please explain why these SAMAs continue not to be cost effective.
17. In the FPL Turkey Point SAMA New and Significant Basis Document, SAMA 98, "Improve inspection of rubber expansion joints on main condenser," was qualitatively screened out because it was determined to be specific to the source plant and not Turkey Point. Please explain.
18. In Table A-5 of the Turkey Point SAMA New and Significant Basis Document, Case No-CI (containment isolation is always successful) yields a reduction in internal flooding LERF of 71 percent. Please justify why this case does not decrease the averted cost risk by more than 50 percent.