NRR-DMPSPEm Resource

From: Mahoney, Michael
Sent: Tuesday, July 17, 2018 8:45 AM
To: Carrie Wilson
Cc: Cecil Fletcher
Subject: Request for Additional Information - Catawba Nuclear Station, Units 1 and 2 - NSWS Single Pond Return Header LAR (CACs MG0245 and MG0246, EPID L-2017-LLA-0297)

Carrie,

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated September 14, 2017, as supplemented by letter dated May 8, 2018 (Agencywide Documents Access Management System (ADAMS) Accession Nos. ML17261B255 and ML18129A053, respectively), Duke Energy, (the licensee), requested changes to the Technical Specifications (TSs) for Catawba Nuclear Station, Units 1 and 2 (Catawba). The license amendment request (LAR) proposes changes to TS 3.7.8, "Nuclear Service Water System," to add a new condition to allow Single Pond Return Header Operation of the NSWS with a 30-Day Completion Time.

In order to complete its review, the U.S. Nuclear Regulatory Commission staff requests the following additional information. Please provide your response to the following requests for additional information (RAIs) within 30 days of the date of this correspondence.

Request for Additional Information (RAI)-05

Facts and Observations Closure Process

In NRC letter dated May 3, 2017 (ADAMS Accession No. ML17079A427), NRC staff accepted, with conditions, the Nuclear Energy Institute (NEI) Appendix X guidance to NEI 05-04, NEI 07-12, and NEI 12-13, “Close-out of Facts and Observations” (ADAMS Accession No. ML17086A431), for use by licensees to close F&Os that were generated during a peer review process.

The NRC staff observed (ADAMS Accession No. ML18117A187) that independent reviews were performed to close F&Os for the Catawba internal events, large early release frequency (LERF), and internal flooding PRAs (e.g., reviews conducted in October 2015 (Phase I), July 2017 (Phase II), and August 2017). Section 3.2.2, "PRA Quality/Technical Adequacy," of the LAR states, “an F&O closure effort was completed in July 2017, for internal flood and LERF, to validate the F&O closure process met the Appendix X requirements (Ref. 3.2.8.10).” In addition, LAR Section 3.2.2.1, “Internal Events, CDF and LERF,” states, “[t]here were 8 internal events PRA Findings which were considered to be open after the December 2015 Peer Review (Table 1 of Ref. 3.2.8.8) and the 2017 independent F&O closure technical review.” The LAR Reference 3.2.8.10 (APC 17-13, “NRC Acceptance of Industry Guidance on Closure of PRA Peer Review Findings,” dated May 8, 2017) is not available to NRC staff, and it is not clear whether the F&O closure effort was performed consistent with the NRC-accepted process discussed in the letter dated May 3, 2017. To address the observations above, the staff requests the following additional information.

a) Provide the following information to confirm that the independent reviews performed to close F&Os for the Catawba internal events, LERF, and internal flooding PRAs (e.g., reviews conducted in October 2015 (Phase I), July 2017 (Phase II), and August 2017) were performed consistent with the NRC-accepted process discussed in the letter dated May 3, 2017.

   i. Provide a summary with a timeline of the independent reviews performed to close F&Os for the internal events, LERF, and internal flooding PRAs. Explain how each of these independent reviews (or combinations thereof) are consistent with the NRC-accepted process for closing F&Os as discussed in the May 3, 2017 letter.

ii. Clarify whether a focused-scope peer review was performed concurrently with these independent reviews. If so, provide the following:

(1) Summary of the scope of the peer review, and

(2) Detailed descriptions of any new F&Os generated from the peer review and the associated dispositions for the application.

iii. Confirm that the independent review teams were provided with a written assessment and justification of whether the resolution of each F&O, within the scope of the independent assessments, constitutes a PRA upgrade or maintenance update, as defined in ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2. If the written assessment and justification for the determination of each F&O was not performed and reviewed by the independent review teams, discuss how this aspect of the F&O closure process was met consistent with the staff's acceptance as discussed in the May 3, 2017 letter.

iv. Appendix X, Section X.1.3, includes five criteria for selecting members of the F&O closure review team. Explain how the selection of members for the independent reviews summarized under Part (i) met the five criteria.

v. Section 4.2 of RG 1.200, Revision 2, states, "[i]f a requirement of the standard has not been met, the licensee is to provide a justification of why it is acceptable that the requirement has not been met." Explain how closure of the F&Os, as summarized under Part (i), was assessed to ensure that the capabilities of the PRA elements, or portions of the PRA within the elements, associated with the closed F&Os now meet Capability Category (CC) II for supporting requirements (SRs) from ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2.

vi. It is unclear whether the scope of the independent reviews included all finding-level F&Os, including those finding-level F&Os associated with SRs that were met at CC II. Owing to their potential impact to the risk results of the proposed CT extension, provide all remaining finding-level F&Os and associated dispositions that were not closed from the independent reviews and not included in LAR Attachment 4, "PRA Peer Review Findings and Resolutions."

b) Alternatively to Part a, provide all finding-level F&Os and associated dispositions that were in scope of the independent reviews performed to close F&Os for the internal events, LERF, and internal flooding PRAs, including any finding-level F&Os associated with SRs that were met at CC II.

RAI-06

Disposition of PRA F&Os

Attachment 4 of the LAR provides PRA peer review F&Os and dispositions for the internal events, internal flooding, high winds, and fire PRAs. Address the following questions related to the dispositions of the internal events and high winds F&Os that do not seem fully resolved for this LAR.

a) High winds F&O WPR-C3-01 is concerned with eight modelling assumptions. The disposition stated that four assumptions were removed from the analysis and the other four were revised and enhanced. Given that modeling assumptions can have a significant impact on core damage frequency (CDF) and LERF results, the NRC staff requests the following additional information:

i. Describe and justify the revised and enhanced assumptions, or

ii. Alternatively, explain why resolution of this F&O has a negligible impact on the risk associated with extending the NSWS CT.

b) Internal events F&O 22-7 states that the human reliability analysis (HRA) dependency analysis recovery rules were inappropriately implemented by applying them first to human error probability (HEP) combinations with low probabilities, rather than to higher order HEP combinations. The disposition to F&O 22-7 indicates that a new HRA dependency analysis was performed and new recovery rules have been implemented in the PRA model used for this application using the Electric Power Research Institute (EPRI) HRA calculator. The NRC staff's review of the disposition to F&O 22-7 has identified additional information shown below to understand full characterization of the risk estimates.

i. Describe the change made to the HRA dependency analysis to resolve F&O 22-7. This description should be of sufficient detail for the NRC staff to determine whether the dependency analysis update is considered a PRA maintenance or PRA upgrade, as defined in ASME/ANS RA-Sa-2009 PRA standard, Section 1-5.4, as qualified by RG 1.200, Revision 2. Also, include in this discussion: (1) a summary of the original dependency analysis method and the new dependency analysis method; (2) changes in PRA scope that impact the significant accident sequences or the significant accident progression sequences; (3) changes in PRA capability that impact the significant accident sequences or the significant accident progression.

ii. Indicate whether the dependency analysis update is a PRA maintenance or PRA upgrade, along with a justification for this determination.

iii. If the dependency analysis update is determined to be a PRA upgrade, then discuss any focused-scope (or full-scope) peer reviews that have been performed for this upgrade and provide peer review findings-level F&Os and their associated dispositions as it pertains to this LAR. If a peer review(s) was not performed for this upgrade, then provide a quantitative evaluation (e.g., sensitivity or bounding analysis) of its effect on the results of this LAR until a focused-scope peer review can be completed. [Note, this sensitivity or bounding analysis should be based on the combined updates of PRA methods or treatments considered in the response to Probabilistic Risk Assessment Licensing Branch (APLA) RAI 15.]

iv. Explain how the fire and high winds PRAs incorporated the dependency analysis update performed for the internal events PRA in response to F&O 22-7. If the fire and high winds PRAs did not incorporate this update, then justify that the fire and high winds PRAs meet PRA quality expectations prescribed in RG 1.200, Revision 2, for risk-informed applications.

Alternatively, incorporate the dependency analysis update performed for the internal events PRA into the fire and high winds PRA models used for this LAR, as appropriate, that aggregate the PRA updates requested in APLA RAI 15.

RAI-07

Updated Internal Events Logic Transferred to Other Hazard Models

Section 3.2.2 of the LAR states that a peer review was performed for the internal events PRA in 2015. It is not clear to what extent the internal events PRA was updated prior to this peer review and in response to F&Os from this peer review. It is generally understood that the mitigation logic (particularly system modeling) from the internal events PRA model is used as the basis for other PRA hazard models. The LAR indicates that the peer review for the high winds PRA was performed in August 2013 and a peer review for the fire PRA was performed in July 2010. Since these reviews occurred prior to the 2015 internal events PRA peer review, it is not clear how the fire and high winds PRAs incorporate internal events PRA updates needed to align with PRA quality expectations prescribed in RG 1.200, Revision 2. To address the above observations, provide the following information.

a) For the internal events, fire, and high winds PRAs used to support this LAR, explain how the fire and high winds PRAs appropriately incorporate the internal events PRA updates performed since the last peer review of the fire and high winds PRAs. Also, summarize these internal events PRA updates.

b) If the fire and high winds PRAs did not appropriately incorporate the internal events PRA updates, then justify how the fire and high winds PRAs meet PRA quality expectations prescribed in RG 1.200, Revision 2, for risk-informed applications. Alternatively, incorporate the updates performed for the internal events PRA, as applicable, into the fire and high winds PRAs used for this LAR that aggregate the PRA updates requested in APLA RAI 15.

RAI-08

Use of ASME/ANS RA-Sb-2013

Section 3.2.2 of the LAR explains that certain peer reviews were conducted with consideration of the changes between the ASME/ANS RA-Sa-2009 and ASME/ANS RA-Sb-2013 PRA standards (e.g., peer reviews of the internal events, internal flooding, and high winds PRAs). The technical adequacy of PRAs used for risk-informed activities is evaluated using RG 1.200, Revision 2, which endorses, with clarifications and qualifications, ASME/ANS RA-Sa-2009. The NRC did not endorse ASME/ANS RA-Sb-2013. Explain how the peer reviews that utilized the 2013 PRA standard meets the technical adequacy guidance in RG 1.200, Revision 2 (e.g., perform a comparison between ASME/ANS RA-Sb-2013 and ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2).

RAI-09

External Events Analysis

The Catawba LAR states that the proposed change to the NSWS TS CT has been evaluated using the risk-informed processes described in RG 1.174, Revision 2, and RG 1.177, Revision 1. Section 2.3.2 of RG 1.177 states, "[t]he scope of the analysis should include all hazard groups (i.e., internal events, internal flood, internal fires, seismic events, high winds, transportation events, and other external hazards) unless it can be shown that the contribution from specific hazard groups does not affect the decision."

The LAR does not explain how it is concluded that the risk associated with the NSWS 30-day CT is not impacted by other external hazards (i.e., hazards other than external flooding, seismic, and those modelled in the PRAs).

a) Provide the results of a systemic assessment of other external hazards (such as those listed in Appendix 6-A of Part 6 of the PRA Standard ASME/ANS RA-Sa-2009) demonstrating that the conclusions of the LAR are not impacted by other external hazards. The systematic assessment should reflect the most current information for each hazard and reflect the as-built, as-operated plant.

b) If the conclusions of the LAR are impacted by other external hazards, incorporate the other external hazards, as applicable, into the risk evaluation used for this LAR that aggregate the PRA updates requested in APLA RAI 15.

RAI-10

Risk Calculations for the NSWS CT Extension

The Catawba LAR states that the proposed change to the NSWS TS CT has been evaluated using the risk-informed processes described in RG 1.174, Revision 2, and RG 1.177, Revision 1. Section 2.3 of RG 1.177 provides guidance on PRA modeling detail needed for TS changes. Section 2.3.3.1 of RG 1.177 states that the PRA "model should also be able to treat the alignments of components during periods when testing and maintenance are being carried out." It also states that "[s]ystem fault trees should be sufficiently detailed to specifically include all the components for which surveillance tests and maintenance are performed and are to be evaluated."

It is not clear how certain aspects of the risk evaluation in support of the LAR meet the guidelines in RG 1.177, Revision 1. Therefore, the NRC staff requests the following additional information:

a) Section 3.2.3.1, ”Model Change Overview,” of the LAR states:

> “For the High Winds, Fire and Internal Flooding models, the PRA model is a <u>single unit model</u> that generally assumes A-Train equipment is running with B Train equipment in standby.”

However, the high winds PRA risk results reported in LAR Tables 3.2.4.4-1 and 3.2.4.4-2 are different across units for each case (i.e., base case, CT case, non-CT case). Similarly, the fire PRA risk results reported in LAR Tables 3.2.4.3-1 and 3.2.4.3-2 are different across units for each case. [Note, the non-CT case is similar to the base case except that it assesses the risk for normal at-power operation with the nominal component unavailability values applied over the time during the year when the NSWS is not in the CT configuration.]

i. For the high winds, fire, and internal flooding “single unit” PRA models (i.e., the single unit PRA is assumed to represent both units), explain how the PRA models are representative or bounding (e.g., the most limiting) for Units 1 and 2. [The NRC staff notes that the internal events results show a difference between units.] Include a discussion of how systems, structures, and components (SSCs) that are shared between both units were implicitly or explicitly modeled in the single unit PRA models, and how differences between the single unit PRA models and Units 1 and 2 for all risk significant systems do not change the conclusions of the LAR.

ii. If the single unit PRAs cannot be justified because the PRAs do not reflect the differences between units, then update the PRAs used for this LAR that aggregate the PRA updates requested in APLA RAI 15 to reflect the difference between units.

iii. While the LAR states that the PRA models for high winds and fire are single unit models, explain why the reported risk results for these hazards (i.e., LAR Tables 3.2.4.3-1, 3.2.4.3-2, 3.2.4.4-1, and 3.2.4.4-2) are different between units for each case. If the reported values are incorrect, provide the correct risk estimates determined for this application after new PRA results are generated in response to APLA RAI 15.

iv. Explain why the internal flooding risk results reported in LAR Tables 3.2.4.2-1 and 3.2.4.2-2 are the same between the base case and non-CT case for CDF. If the reported values are incorrect, provide the correct risk estimates determined for this application after new PRA results are generated in response to APLA RAI 15.

b) Section 2.3.4 of RG 1.177, Revision 1, states:

> “When calculating the risk impacts (i.e., a change in CDF or LERF caused by CT changes), the change in average CDF should be estimated using the mean outage times (or an appropriate surrogate) [i.e., use the average test and maintenance model] for the current and proposed CTs. If a licensee chooses to use the zero maintenance state as the base case (i.e., the case in which no equipment is unavailable because of maintenance), an explanation stating so should be part of the submittal.”

While LAR Section 3.2.3.2 does substantiate certain maintenance events being set to zero for the CT case, the LAR does not specify whether the average test and maintenance (TM) model or zero TM model was used for the risk evaluations associated with the base case, CT case, and non-CT case.

i. Specify whether the average TM model or zero TM model was used for the risk evaluations associated with the base case, CT case, and non-CT case in support of this LAR.

ii. If the zero TM model was used for any of these cases, then justify its use. If a justification cannot be provided, then demonstrate (such as via a sensitivity study using the combined PRA updates considered in the response to APLA RAI 15) that use of the average TM model would not change the conclusions of this LAR.

Alternatively, incorporate the average TM model in the risk evaluation supporting the LAR that aggregate the PRA updates requested in APLA RAI 15.

iii. Clarify which SSCs from LAR Table 3.2.6-1, "Tier 2 SSCs," were assumed to be available (i.e., not unavailable due to TM, or the TM basic event was set to zero) for the CT case. For these SSCs that are assumed to be available in the CT case, explain how the licensing basis will ensure that these SSCs will be prevented from being taken out-of-service during the NSWS CT.

c) Clarify whether the Emergency Supplemental Power Source (ESPS) is credited in the risk evaluations associated with the base case, CT case, and non-CT case. If credited, provide a brief description of how it is credited.

RAI-11

Reasonableness of Human Error Probabilities for Operator Actions

The Catawba LAR states that the proposed change to the TS CT has been developed using the risk-informed processes described in RG 1.174, Revision 2, and RG 1.177, Revision 1. Section 2.3.1 of RG 1.177 states that the technical adequacy of the PRA must be compatible with the safety implications of the TS change being requested and the role that the PRA plays in justifying that change. Section 2.3.2 of RG 1.174 states that the risk assessment supporting a risk-informed LAR should properly account for the effects of the changes on operator actions.
Section 3.2.3.2 of the LAR states:

> "For HRA considerations, recovery actions are planned to address events such as swapping the NSWS suction and discharge back to Lake Wylie, restoring power to key MOVs [motor-operated valves] for isolation and local operation of manual valves for isolation. The internal events, internal flooding and high winds analyses used a bounding analysis in which such potential accident sequence recoveries were added to the model but were not credited (i.e., HRA events set to 1.0). … However, in assessing the fire CT risk results, it became necessary to quantify these values to address the spurious operation of MOVs."

Based on the LAR, additional recovery actions were credited in the fire CT risk evaluation to address spurious operation of MOVs. This demonstrates the importance of calculating realistic HEPs for these recovery actions. It is not clear whether the licensee has the applicable procedures in place for these recovery actions, which could query the validity of the analysis of these actions.

To understand the full characterization of the risk estimates, address Part (a) <u>or</u> Part (b) below:

a) Describe the new recovery actions credited in the fire PRA in support of the LAR. Also, describe any previously modeled recovery actions whose HEPs were modified in the fire PRA in support of the LAR. For the recovery actions identified above, provide the following additional information:

i. Explain how the recovery actions' HEPs were developed or modified. Provide sufficient details and numerical values to understand the basis for these HEPs, including:

- A discussion of the specific actions and instructions for these recovery actions, including the cues or indications operators will use to initiate these actions. Provide a timeline for these operator actions, and how the time available and time required to complete operator actions were estimated.

- Explain whether the modeling and feasibility study of these recovery actions were performed consistent with guidance in NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Analysis

Guidelines - Final Report," July 2012 (ADAMS Accession No. ML12216A104). Otherwise, justify the basis for the HRA of these operator actions.

ii. If any recovery actions/HEPs discussed in Part (i) cannot be justified, then modify the HRA using a defensible basis and incorporate the results into the fire PRA used for this LAR that aggregate the PRA updates requested in APLA RAI 15. Explain how the HRA was modified and provide sufficient details to justify the basis for the modification(s).

iii. For each recovery action credited in the fire CT case but not credited in the fire base case, confirm the recovery action is new to the plant in support of the LAR (e.g., new changes made to the plant design/plant procedures as a result of this LAR and are not in the current licensing basis/plant procedures).

For each recovery action where confirmation cannot be provided, include credit for the recovery action in the fire base case used for this LAR that aggregate the PRA updates requested in APLA RAI 15.

iv. Propose a mechanism (e.g., a license condition) to complete the following prior to implementing the TS 30-day CT for Single Pond Return Header Operation of the NSWS: (1) provide/revise plant procedures and required training, as necessary, for the credited recovery actions; (2) update the HEPs, fire PRA, and risk estimates associated with this LAR, as needed, to be consistent with these procedures and training; and (3) confirm that the updated risk estimates associated with this LAR meet the RG 1.174 and RG 1.177 risk acceptance guidelines. Also, include in this mechanism a plan of action should the updated risk estimates associated with this LAR exceed the RG 1.174 and RG 1.177 risk acceptance guidelines. Alternatively, justify why this mechanism is not needed.

b) Alternatively, remove credit for these recovery actions in the fire PRA used for this LAR that aggregate the PRA updates requested in APLA RAI 15.

RAI-12

Tier 2, Avoidance of Risk-Significant Plant Configurations

The Catawba LAR states that the proposed change to the TS CT has been developed using the risk-informed processes described in RG 1.174, Revision 2, and RG 1.177, Revision 1. Section 2.3 of RG 1.177, Revision 1, cites the need to avoid risk-significant plant configurations and discusses Tier 2 of the RG 1.177 three-tiered approach for evaluating risk associated with proposed TS CT changes. According to RG 1.177, Tier 2, the licensee should provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is out-of-service consistent with the proposed TS change. Once the specific plant equipment is identified, an assessment can be made as to whether certain enhancements to the TS or procedures are needed to avoid risk-significant plant configurations. In addition, RG 1.177, Section 2.4 states, as part of the acceptance guidelines specific to permanent CT changes, the licensee should demonstrate that there are appropriate restrictions on dominant risk-significant configurations associated with the change.

Section 3.2.6, “Tier 2 Component Evaluation,” of the LAR provides a discussion of Tier 2 (i.e., avoidance of risk-significant plant configurations) and identifies in Table 3.2.6-1 those SSCs that are important to the 30-day NSWS CT. Furthermore, LAR Section 3.2.6 states that unavailability of these SSCs should be avoided during the CT. However, with the exception of NSWS and emergency diesel generator (EDG) SSCs, the LAR does not describe a mechanism or a set of controls that will be used by the plant to avoid the unavailability of these SSCs.

To address the observations above, explain how the unavailability of SSCs identified in LAR Table 3.2.6-1 (which represent high risk configurations) will be avoided during the 30-day NSWS CT. Include a detailed discussion of the mechanism that ensures these high risk configurations will be avoided.

RAI-13

Tier 3, Risk-Informed Configuration Risk Management

The Catawba LAR states that the proposed change to the TS CT has been developed using the risk-informed processes described in RG 1.174, Revision 2, and RG 1.177, Revision 1. Section 2.3 of RG 1.177, Revision 1, cites the need to establish an overall configuration risk management program to ensure that other potentially lower probability, but nonetheless risk-significant configurations resulting from maintenance and other operational activities are identified and compensated for (Tier 3).

The LAR does not address Tier 3 during the NSWS 30-day CT. Explain how Tier 3 in RG 1.177 will be met during the NSWS 30-day CT. Discuss the mechanism (e.g., programs and procedures) that ensures: (1) risk-significant plant configurations resulting from maintenance or other operational activities are identified in a timely manner, (2) appropriate compensatory measures are taken to avoid risk-significant configurations, and (3) the associated risk impact is appropriately assessed and managed.

RAI-14

Sensitivity and Uncertainty Analyses Relating to Assumptions in Technical Specification Change Evaluations

The Catawba LAR states that the proposed change to the TS CT has been developed using the risk-informed processes described in RG 1.174, Revision 2, and RG 1.177, Revision 1. Section 2.3.5 of RG 1.177 states:

> "As in any risk-informed study, risk-informed analyses of TS changes can be affected by numerous uncertainties regarding the assumptions made during the PRA model's development and application. Sensitivity analyses may be necessary to address the important assumptions in the submittal made with respect to TS change analyses."

RG 1.177 relies on RG 1.200, Revision 2, for addressing the technical adequacy of the PRA. Regulatory Guide 1.200, Revision 2, Section 3.3.2, states, "for each application that calls upon this regulatory guide, the applicant identifies the key assumptions and approximations relevant to that application. This will be used to identify sensitivity studies as input to the decision-making associated with the application."

The LAR does not address sensitivity and uncertainty analyses relating to assumptions made in the PRAs and risk evaluations in support of this LAR. The NRC staff's review of the information in the LAR has identified additional information needed to understand the full characterization of the risk estimates.

a) Describe the key assumptions and key sources of uncertainty identified in the PRAs used to support the LAR. [RG 1.200, Revision 2, Section 3.3.2, defines the terms "key assumption" and "key source of uncertainty."] Discuss how each key assumption and key source of uncertainty identified above was dispositioned for this application.

b) Describe the approach used to identify and characterize the "key" assumptions and "key" sources of uncertainty in the PRAs for this application.

RAI-15

Aggregate Update Analysis

Regulatory Guide 1.174, Revision 2, provides quantitative guidelines on CDF and LERF and identifies acceptable changes to these frequencies that result from proposed changes to the plant's licensing basis and describes a general framework to determine the acceptability of risk-informed changes. Regulatory Guide 1.177, Revision 1, provides risk acceptance guidelines on incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP) and identifies acceptable changes to these probabilities that result from proposed permanent TS changes. The NRC staff's review of the

information in the LAR has identified additional information that is needed to understand full characterization of the risk estimates.

The PRA methods and treatments discussed in the following APLA RAIs may need to be revised to be acceptable by the NRC:

- APLA RAI 06.b.iv, regarding incorporating the dependency analysis update performed for the internal events PRA into the fire and high winds PRAs.
- APLA RAI 07.c, regarding incorporating internal events PRA updates into the fire and high winds PRAs.
- APLA RAI 09, regarding incorporating other external hazards.
- APLA RAI 10.a, regarding updating the single unit PRAs to reflect the differences between Unit 1 and Unit 2.
- APLA RAI 10.b, regarding incorporating the average TM model into the PRAs.
- APLA RAI 11.a.ii, regarding incorporating more appropriate recovery action HEPs into the fire PRA.
- APLA RAI 11.a.iii, regarding incorporating credit for recovery actions in the fire base case.
- APLA RAI 11.b, regarding removing credit for recovery actions in the fire PRA.

To address the RAIs cited above, provide the following:

a) For the PRA updates identified in response to the RAIs cited above, provide the results of an aggregate analysis that reflect the combined impact of these PRA updates on the LAR risk results (i.e., change in CDF, change in LERF, ICCDP and ICLERP).

b) For each APLA RAI listed above that resulted in changes to the PRA or risk assessment, summarize briefly how the issue(s) cited in the RAI was resolved in the PRA and/or LAR. If the resolution involved an update to the PRA models, then briefly summarize the PRA update.

c) Confirm that the updated results still meet the risk acceptance guidelines in RG 1.177, Revision 1, and RG 1.174, Revision 2.

d) If the risk acceptance guidelines are exceeded, then identify which risk acceptance guidelines are exceeded and provide qualitative or quantitative justification that support the conclusions of the LAR. If applicable, include discussion of conservatisms in the analysis and the risk significance of these conservatisms.

RAI-16

Seismic Evaluation

Consistent with Regulatory Position 2.3.2 of RG 1.177, Revision 1, the scope of the analysis should include all hazard groups (e.g., seismic in this case) unless it can be shown that the contribution from specific hazard groups does not affect the decision.

The licensee stated in LAR Section 3.2.4.6 that structures such as NSWS pump structure as well as the Standby Nuclear Service Water Pond (SNSWP) intake and discharge structure were screened from the seismic PRA analysis performed for the Catawba Individual Plant Examination of External Events submittal. The licensee concluded that the consideration of risk from seismic events “while the plant is in the SNSWP single return header configuration is not a significant factor for this assessment.” It is not clear whether the

licensee's qualitative assessment has considered impact of seismic failures for all SSCs that could affect the change in risk for this application.

Describe the seismic ruggedness of SSCs of which seismic failures may affect this application and demonstrate that the impact of seismic events, considering the re-evaluated hazard, on these SSCs would not affect the decision on the proposed single pond return header configuration.

Once this email is added to ADAMS, I will provide the accession number for your reference.

Thanks
Mike

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