From: Galvin, Dennis
Sent: Wednesday, October 27, 2021 10:43 AM
To: Jack Hicks (Jack.Hicks@luminant.com)
Cc: Struble, Garry; Dixon-Herrity, Jennifer
Subject: Comanche Peak Units 1 and 2 - License Amendment Request to Adopt TSTF-505 – Audit Plan Update and Audit Questions (L-2021-LLA-0085)
Attachments: Comanche Peak - TSTF 505 - Audit Plan - Audit Questions 2021-10-27.pdf

Dear Mr. Hicks,

By letter dated May 11, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML (ML21131A233) as supplemented by letter dated July 13, 2021 (ML21194A078), Vistra Operations Company, LLC (Vistra OpCo, the licensee) submitted a license amendment request (LAR) regarding Comanche Peak Nuclear Power Plant Units 1 and 2 (Comanche Peak). The proposed amendment would revise Technical Specification (TS) requirements to permit the use of risk informed completion times for actions to be taken when limiting conditions for operation are not met. The proposed changes are based on TSs Task Force Traveler (TSTF)-505, Revision 2, "Provide Risk Informed Extended Completion Times – RITSTF Initiative 4b," dated July 2, 2018 (ADAMS Accession No. ML18183A493). The U.S. NRC issued a final model safety evaluation (SE) approving TSTF-505, Revision 2, on November 21, 2018 (ADAMS Accession No. ML18269A041).

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that a regulatory audit would support its review of the proposed license amendment. The audit will be conducted via online access to non-docketed information set up by the licensee and via webinar. On August 9, 2021, the NRC staff provided an audit plan and a request for online access to documents (ADAMS Accession No. ML21222A033). The enclosed audit plan update provides an agenda for the audit webinar and identifies information to be available during the webinar and audit questions. The audit information the NRC staff determines to be necessary to support the development of the NRC staff's safety evaluation will be requested to be submitted on the docket following the webinar portion of the audit.

If you have any questions, please contact me at (301) 415-6256.

Respectfully,

Dennis Galvin
Project Manager
U.S Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Operating Reactor Licensing
Licensing Project Branch 4
301-415-6256

Docket No. 50-445, 50-446

Hearing Identifier: NRR_DRMA
Email Number: 1396

Mail Envelope Properties (SA1PR09MB8111BBD8F1DA63505F27CCECFB859)

Subject: Comanche Peak Units 1 and 2 - License Amendment Request to Adopt TSTF-505 – Audit Plan Update and Audit Questions (L-2021-LLA-0085)
Sent Date: 10/27/2021 10:43:01 AM
Received Date: 10/27/2021 10:42:00 AM
From: Galvin, Dennis

Created By: Dennis.Galvin@nrc.gov

Recipients:
"Struble, Garry" <Garry.Struble@luminant.com>
Tracking Status: None
"Dixon-Herrity, Jennifer" <Jennifer.Dixon-Herrity@nrc.gov>
Tracking Status: None
"Jack Hicks (Jack.Hicks@luminant.com)" <Jack.Hicks@luminant.com>
Tracking Status: None

Post Office: SA1PR09MB8111.namprd09.prod.outlook.com

Files	Size	Date & Time
MESSAGE	2032	10/27/2021 10:42:00 AM
Comanche Peak - TSTF 505 - Audit Plan - Audit Questions 2021-10-27.pdf	241162	

Options
Priority: Normal
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:

AUDIT PLAN

LICENSE AMENDMENT REQUEST TO ADOPT RISK-INFORMED EXTENDED COMPLETION TIMES

VISTRA OPERATIONS COMPANY, LLC

COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET Nos. 50-455 and 50-446

1.0 BACKGROUND

By letter dated May 11, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21131A233), as supplemented by letter dated July 13, 2021 (ADAMS Accession No. ML21194A078), Vistra Operations Company, LLC (Vistra, the licensee) requested that the U.S. Nuclear Regulatory Commission (NRC) modify Technical Specifications (TS) requirements for Comanche Peak Nuclear Power Plant (Comanche Peak) Units 1 and 2. Vistra's proposed license amendment request (LAR) would revise TS requirements to permit the use of risk-informed completion times (RICTs) for actions to be taken when limiting conditions for operation are not met. The proposed changes are based on Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 2, "Provide Risk Informed Extended Completion Times – RITSTF Initiative 4b," dated July 2, 2018 (ADAMS Package Accession No. ML18269A041).

The audit will be conducted via online access to non-docketed information set up by the licensee and via webinar. On August 9, 2021, the NRC staff provided an audit plan and a request for online access to documents (ADAMS Accession No. ML21222A033). This audit plan update provides an agenda for the audit webinar and identifies information to be available during the webinar and audit questions.

2.0 REGULATORY AUDIT BASES

A regulatory audit is a planned license or regulation-related activity that includes the examination and evaluation of primarily non-docketed information. The 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 a licensing or regulatory decision. Performing a regulatory audit is expected to assist the NRC staff in efficiently conducting its review and gaining insights for licensee's processes and procedures. Information that the NRC staff relies upon to make the safety determination must be submitted on the docket.

The audit will be performed consistent with NRC Office Instruction LIC-111, Revision 1, "Regulatory Audits," dated October 31, 2019 (ADAMS Accession No. ML19226A274). An audit was determined to be the most efficient approach toward a timely resolution of issues associated with this LAR review, since the staff will have an opportunity to minimize the potential for multiple rounds of requests for additional information (RAIs) and ensure no unnecessary burden will be imposed by requiring the licensee to address issues that are no longer necessary to make a safety determination.

3.0 PURPOSE AND SCOPE

The purpose of this audit is to:

- Gain a better understanding of the calculations, analyses, and bases underlying the LAR. Confirm the staff's understanding of the LAR.
- Gain a better understanding of the approach for developing and implementing nuclear power station risk-managed TS programs.
- Identify information that the licensee should submit for staff to reach a regulatory decision. Discuss potential RAIs.
- Gain a better understanding of the extent that the licensee's proposed amendment to modify TS requirements for RICTs is consistent with TSTF-505, Revision 2, and Nuclear Energy Institute (NEI) 06-09, Revision 0-A, "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines, Industry Guidance Document," dated November 6, 2006 (ADAMS Accession No. ML12286A322 (part of ADAMS Package Accession No. ML122860402)).
- Gain a better understanding of whether the proposed configurations introduce any adverse effects on the ability or capacity of plant equipment to perform its design-basis function(s) when the plant is operated in the proposed TS allowable configuration.
- Gain a better understanding of the technical acceptability of the probabilistic risk assessment (PRA) for use in the application and how plant design features are modeled in the PRA used to support the LAR.

The areas of focus for the regulatory audit are the information contained in the LAR, the audit information needs listed in the following section of this audit plan supplement, and all associated and relevant supporting documentation (e.g., methodology, process information, calculations, etc.). The relevant supporting documents are identified below.

4.0 INFORMATION AND OTHER MATERIAL NECESSARY FOR THE REGULATORY AUDIT

The NRC staff proposes conducting the audit over 2 weeks. The first week, from November 30 to December 2, 2021, the NRC staff will audit the TS changes and the potential loss of function (LOF) issues. The second week, from December 6-9, 2021, the NRC staff will audit PRA issues.

To support the first week, the NRC staff requests the following:

The licensee should be prepared to share the following information:

a. Readable one-line diagrams for alternating current (AC) and direct current (DC) power distribution systems
b. Information on diesel generators (DGs) and associated supporting systems (i.e., buses and loads) with regard to:
    i. when required
    ii. minimum required for each unit
c. Load list
d. List of any loads shared between the following:
    i. Units

ii. AC distribution systems
iii. DC distribution systems

The licensee is requested to provide a presentation on the following topics

a. Normal and emergency lineups for AC sources and distribution systems addressing
    i. Offsite primary and secondary feeds for each unit and other possibilities
    ii. Any shared equipment or cross-tie and a clarification of whether they are modeled in PRA
    iii. If shared equipment is used, describe whether manual actions are required and these manual actions are credited in the PRA

b. Normal and emergency lineups for DC sources and distribution systems addressing
    i. Any shared equipment or cross-tie and a clarification of whether they are modeled in PRA
    ii. If shared equipment is used, describe whether manual actions are required and these manual actions are credited in the PRA

c. Required engineered safety feature (ESF) buses for each unit
    i. Any ESF buses tie breakers, when used, and under what conditions
    ii. Sharing of ESF loads between units with offsite power available and not available with regard to the capability to safely shutdown each unit to mitigate licensing basis accidents and transients.

d. Assuming a station loss of offsite power (LOOP) and loss of coolant accident (LOCA) in one unit, what AC sources and distribution systems/subsystems required for safe shutdown of each unit.

To support the second week, the NRC staff requests the following:

The following documentation should be available to the audit team on the portal:

- RICT program procedures (e.g., risk-management action (RMA) procedure, PRA functionality determination procedure, recording limiting condition of operation (LCO) procedure, etc.), as available
- All PRA models (e.g., internal events, internal flooding, fire PRA, and PRA documentation, including PRA notebooks
- All PRA peer review reports, self-assessments of the PRA models, and facts and observations (closure reports)
- Documentation of changes to the PRA models with justification of upgrades and updates
- PRA configuration control procedures
- Analyses supporting PRA success criteria, which differ from design-basis criteria
- Documentation of review of PRA model assumptions and sources of uncertainty and identification of key assumptions and sources of uncertainty for the application identified in the LAR
- Documentation supporting the development and benchmarking against the PRA of the Electric Power Research Institute (EPRI) Phoenix Risk Monitor tool
- System diagrams (including, piping and instrumentation diagrams), as applicable to audit questions

The licensee should be prepared to provide the following examples and demonstrations:

- Demonstration of EPRI Phoenix Risk Monitor tool
- Example of RICT calculation
- Example of PRA functional definition, development, and use
- Example of RMA determination
- Modeling of the instrumentation and controls LCOs in the PRA

The licensee should be prepared to discuss:

- LAR and RICT program
- PRA technical acceptability
- PRA model assumptions and sources of uncertainty and the process for identification and disposition of the key assumptions and sources of uncertainty
- Calculation of the RICT estimates presented in the LAR
- External events treatment for the RICT program
- How RMAs are determined and implemented
- Reviews and benchmark testing of the EPRI Phoenix Risk Monitor tool to ensure results are consistent with the baseline PRA model
- PRA modeling for select LCOs
- Why certain LCOs do not constitute a loss of function, and how all design-basis criteria are met when entering the specified LCO
- How cumulative risk (i.e., core damage frequency and large early release frequency) will be evaluated and tracked

The specific questions that the audit team would like to discuss with Vistra concerning the proposed RICT program are provided to in Attachment 2. The audit team will not remove non-docketed information from the audit site.

5.0 AUDIT TEAM

The members of the audit team are anticipated to be:

- Dennis Galvin, Project Manager, NRC (Dennis.Galvin@nrc.gov)
- Jigar Patel, Reliability and Risk Engineer, NRC (Jigar.Patel@nrc.gov)
- Jeff Circle, Senior Reliability and Risk Engineer, NRC (Jeff.Circle@nrc.gov)
- Milton Valentin, Reliability and Risk Engineer, NRC (Milton.Valentin-Olmeda@nrc.gov)
- Wesley Wu, Reliability and Risk Engineer, NRC (De.Wu@nrc.gov)
- Robert Vettori, Fire Protection Engineer, NRC (Robert.Vettori@nrc.gov)
- Steve Wyman, Electrical Engineer, NRC (Stephen.Wyman@nrc.gov)
- Khoi Nguyen, Electrical Engineer, NRC (Khoi.Nguyen@nrc.gov)
- Ming Li, Electronics Engineer, NRC (Ming.Li@nrc.gov)
- Norbert Carte, Senior Electronics Engineer, NRC (Norbert.carte@nrc.gov)
- Khadijah West, Safety and Plant Systems Engineer, NRC (Khadijah.West@nrc.gov)
- Hanry Wagage, Senior Safety and Plant Systems Engineer, NRC (Hanry.Wagage@nrc.gov)
- Fred Forsaty, Nuclear Engineer, NRC (Fred.Forsaty@nrc.gov)

- Steven Short, Contractor, Pacific Northwest National Laboratory (Steve.Short@pnnl.gov)

The NRC staff requests access to the portal for those NRC staff not previously granted.

6.0 LOGISTICS

As previously noted, the audit will be nominally conducted from November 30-December 2, 2021, and December 6-9, 2021 remotely via MS Teams between 9:00 a.m. and 4:00 p.m. EST each day. A proposed agenda for the audit is provide in Attachment 1 to this audit plan supplement. The NRC project manager will coordinate any changes to the audit schedule and logistics with the licensee.

7.0 DELIVERABLES

An audit summary, which may be public, will be prepared within 90 days of the completion of the audit. If the NRC staff identifies information during the audit that is needed to support its regulatory decision, the staff will issue RAIs to the licensee after the audit.

Proposed Audit Agenda

November 30

Morning

- Kick-off for technical specification (TS) changes and the potential loss of function (LOF) issues. Opening comments - NRC and Vistra. Introductions and logistics.
- TS Changes (Audit Questions 26-28)
- Electrical Presentations
- Electrical Issues (Audit Questions 20-24).

Afternoon

- Loss of Power Instrumentation Issues (Audit Question 25).
- Summary of the day.
- NRC staff meeting.

December 1

- Follow-up on November 30 topics if necessary

December 2

- Follow-up on November 30 topics if necessary
- Exit Meeting for TS changes and LOF issues (will be advanced if necessary)

December 6

Morning

- Kick-off for PRA Issues. Opening comments - NRC and Vistra. Introductions and logistics.
- Real-time Risk Model demonstration by Vistra.
- Internal Events PRA (Audit Questions 8 and 9).

Afternoon

- External Hazards (Audit Questions 17-19).
- Summary of the day.
- NRC staff meeting.

December 7

Morning

- Summary of previous day
- Internal Events PRA (Audit Questions 1-5)

Afternoon

- Fire PRA (Audit Questions 15, 16).
- Summary of the day.
- NRC staff meeting.

<u>December 8</u>

Morning

- Summary of previous day.
- Internal Events PRA (Audit Questions 6, 7, 10, 11)

Afternoon

- Fire PRA (Audit Questions 16).
- Summary of the day.
- NRC staff meeting.

<u>December 9</u>

Morning

- Summary of previous day.
- Internal Events PRA (Audit Questions 12-14).
- Any remaining questions

Afternoon

- Any remaining questions
- Summary of audit
- Exit meeting for PRA Issues.

Audit Questions

QUESTION 01 – Evaluation of Common Cause for Planned Maintenance (APLA)

NEI 06-09, Revision 0-A, states that no common cause failure (CCF) adjustment is required for planned maintenance. The NRC safety evaluation (SE) for NEI 06-09, Revision 0, dated May 17, 2007 (ADAMS Accession No. ML071200238), is based on conformance with Regulatory Guide (RG) 1.177, Revision 1, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," dated May 2011 (ADAMS Accession No. ML100910008). Specifically, the NRC SE, Section 2.2, states that, "specific methods and guidelines acceptable to the NRC staff are […] outlined in RG 1.177 for assessing risk-informed TS changes." The NRC SE, Section 3.2, further states that compliance with the guidance of RG 1.174, Revision 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," dated November 2002 (ADAMS Accession No. ML023240437), and RG 1.177, Revision 1, "is achieved by evaluation using a comprehensive risk analysis, which assesses the configuration-specific risk by including contributions from human errors and common cause failures."

RG 1.177, Revision 2, dated January 2021 (ADAMS Accession No. ML19206A493) provides one acceptable approach to addressing the guidelines in RG 1.177, Revision 1. RG 1.177, Revision 2, Section 2.3.3.1, states that, "CCF modeling of components is not simply dependent on the number of remaining inservice components; it is also dependent on the reason the components were removed from service (i.e., whether for preventative or corrective maintenance)." In relation to CCF for preventive maintenance, the guidance in RG 1.177, Appendix A, Section A-1.3.1.1, states:

> *If the component is down because it is being brought down for maintenance (but not failed), the CCF contributions involving the component should be modified to remove the component and to only include failures of the remaining components (also see Section C.2.3.3 of this RG).*

According to the guidance of RG 1.177, Revision 2, if a component from a CCF group of three or more components is declared inoperable, the CCF of the remaining components should be modified to reflect the reduced number of available components in order to properly model the as-operated plant.

The LAR does not discuss how CCFs are treated in the PRA models for planned maintenance. Therefore, address the following:

a) Explain how CCFs are included in the PRA model (e.g., with all combinations in the logic models as different basic events or with identification of multiple basic events in the cut sets);

b) Describe how the treatment of CCF is evaluated for configuration-specific risk when quantifying a risk-informed completion time (RICT). Explain how the quantification and/or models will be changed when, for example, one train of a 3×100 percent train system is removed for preventative maintenance vs. corrective maintenance.

QUESTION 02 – Internal Events PRA Supporting Requirements (SRs) that are Capability Category (CC) I (APLA)

RG 1.200, Revision 3, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," (ADAMS Accession No. ML20238B871) provides guidance for addressing PRA acceptability. LAR Enclosure 2 states that the Comanche Peak PRA was developed in accordance with the guidance in this regulatory guide. Regulatory Guide 1.200, Section C.2.1 specifies that, generally, the NRC staff anticipates that CC II of the ASME/ANS PRA standard ASME/ANS-RA-Sa-2009, "Addenda to ASME/ANS RA-S-2008, Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," is the level of detail that is acceptable for the majority of applications, but that CC I may be acceptable for some requirements.

LAR Enclosure 2, Section 2.0 presents the assessment of supporting requirement (SR) LE-C11 which addresses in part those sequences that would result in a large early release. SR LE-C11 was assessed by the peer review to be Met at CC I. This SR was assessed to meet CC I because mitigating equipment and operator actions are not credited in the PRA after containment failure. The assessment of this SR states that mitigating equipment and operator actions are not credited because "there are none that are significant." However, the assessment of this SR further states that the "impact on specific applications will be evaluated as needed." Not fully crediting structures, systems, and components (SSCs) in technical specifications (TSs) that are included in the RICT program may lead to a non-conservative treatment for the TSTF-505 application because this may result in underestimating associated RICTs. The LAR does not explain how the impact of CC I will be evaluated for the TSTF-505 application (or on the calculation of RICTs). Therefore, address the following:

a) Provide justification that not crediting operation of mitigating equipment and operator actions after failure of containment does not result in non-conservative RICTs or has a non-significant impact on calculated RICTs.

b) Alternatively, explain how meeting CC I will be evaluated for impact on the RICT program (i.e., on calculated RICTs).

QUESTION 03 – Total Risk and Accounting for the State of Knowledge Correlation (SOKC) (APLA)

RG 1.174 provides the risk acceptance guidance for total core damage frequency (CDF) (1E-04 per year) and Large Early Release Frequency (LERF) (1E-05 per year). NRC staff notes based on RG 1.174 and Section 6.4 of NUREG-1855, Revision 1, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making," dated March 2017 (ADAMS Accession No. ML17062A466), for a CC II risk evaluation, the mean values of the risk metrics (total and incremental values) need to be compared against the risk acceptance guidelines. The mean values referred to are the means of the probability distributions that result from the propagation of the uncertainties on the PRA input parameters and model uncertainties explicitly reflected in the PRA models. In general, the point estimate CDF and LERF obtained by quantification of the cutset probabilities using mean values for each basic event probability does not produce a true mean of the CDF/LERF. Under certain circumstances, a formal propagation of uncertainty may not be required if it can be demonstrated that the SOKC is unimportant (i.e., the risk results are well below the acceptance guidelines).

LAR Enclosure 5, Section 2 presents the hazard-specific and the total CDF and LERF values in Table 1 for both Comanche Peak units. NRC staff notes that for Comanche Peak Unit 1, the total LERF presented in the LAR is 8.2E-06 per year. The LAR does not explain how the CDF and LERF values were calculated for the internal events, internal flood, and internal fire hazards. If they are "point estimate" values, then they are likely lower than the mean CDF and LERF values wherein SOKC is accounted for in the quantification. In addition, NRC staff notes that the current PRA models could potentially be updated in response to information requests (e.g., such as the response to requests on the acceptability of fire PRA methods). Therefore, the total LERF could approach the RG 1.174, Revision 3 guideline value of 1E-05 per year when the total mean LERF is used accounting for the SOKC and potential risk increases associated with model updates. Therefore, address the following:

a) Demonstrate that, after the total mean internal events and fire CDF and LERF values are calculated to account for the SOKC and for potential changes in risk due to any updates to PRA models performed in response to NRC staff information requests, the total risk for Unit 1 and 2 is in conformance with RG 1.174 risk acceptance guidelines (i.e., CDF < 1E-04 and LERF < 1E-05 per year). Include identification of the fire PRA parameters that are assumed to be correlated in the parametric uncertainty analysis of fire events.

b) Alternatively, propose a mechanism that ensures calculation of the mean internal events, internal flood, and internal fire CDFs and LERFs, account for the SOKC and updates to the PRA models performed in response to NRC staff information requests prior to implementation of the RICT program. The mechanism must also ensure confirmation that the updated total CDF and LERF values are still in conformance with the RG 1.174 risk acceptance guidance (i.e., CDF < 1E-04 and LERF < 1E-05 per year) prior to implementation of the RICT program.

c) Discuss how the SOKC will be addressed for the RICT program, and how this treatment is consistent with NUREG-1855, Revision 1 when the risk increase associated with SOKC is considered.

QUESTION 04 – PRA Model Uncertainty Analysis Process (APLA)

The NRC staff SE to NEI 06-09, Revision 0, specifies that the LAR should identify key assumptions and sources of uncertainty and to assess and disposition each as to their impact on the RMTS application. NUREG-1855, Revision 1, presents guidance on the process of identifying, characterizing, and qualitative screening of model uncertainties.

LAR Enclosure 9 states that the process for identifying key assumptions and sources of uncertainty for all PRA models (internal events, internal flood, and internal fire) was performed using the guidance in NUREG-1855, Revision 1. The LAR indicates that plant-specific sources of uncertainty were identified and characterized by a review of all PRA notebooks, but that generic sources of uncertainty were also identified and characterized. The LAR further explains that both the plant-specific and generic assumptions and uncertainties were evaluated for impact on the baseline PRA model and on the TSTF-505 application, and that applicable sensitivity analyses were performed as necessary to assess the impacts of assumptions/uncertainties on the baseline PRA model while no additional sensitivity analyses were needed to assess the impacts of assumptions/uncertainties on the TSTF-505 application. Table 1 of Enclosure 9 of the LAR provides the dispositions to 11 key sources of assumptions and uncertainties that were determined to have a potential impact on the TSTF-505 application. Additional information is needed for the NRC staff to make a determination that the key assumptions and sources of uncertainty have been appropriately identified and assessed for impact on the TSTF-505 application, including that impacts on the LCOs to be included within the scope of the RMTS program have been considered. Address the following:

a) Describe the process for identifying a comprehensive list of generic assumptions and sources of uncertainty for each of the PRA models (i.e., internal events, internal flooding, and internal fire). In the response, specifically address how the guidance in NUREG-1855, Revision 1 was implemented with regard to use of EPRI Topical Report (TR) 1016737, "Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments" and EPRI TR 1026511, "Practical Guidance of the Use of Probabilistic Risk Assessment in Risk-informed Applications with a Focus on the Treatment of Uncertainty."

b) For each of the PRA models (i.e., internal events, internal flooding, and internal fire), describe the general evaluation criteria used to consistently screen assumptions and sources of uncertainty from an initial comprehensive list (including those associated with plant specific features, modeling choices, and generic industry concerns) in order to produce the list of key assumptions and sources of uncertainty that is presented in the LAR. In the response, specifically address how this criteria considered potential impacts on each LCO included within the scope of the RMTS program.

c) Concerning the evaluation criteria used to evaluate and screen uncertainties addressed in part (b) above:

   i. Discuss the criteria used to consistently determine when a sensitivity study was used to address the identified source of uncertainty.

   ii. Discuss the criteria used to consistently determine when additional risk management actions (RMAs) should be implemented because of modelling uncertainty.

QUESTION 05 – Dispositions of PRA Model Assumptions and Sources of Uncertainty (APLA)

The NRC staff SE to NEI 06-09, Revision 0, specifies that the LAR should identify key assumptions and sources of uncertainty and to assess and disposition each as to their impact on the RMTS application. NUREG-1855, Revision 1, presents guidance on the process of identifying, characterizing, and qualitative screening of model uncertainties.

LAR Enclosure 9 Table 1 provides dispositions for 11 candidate key assumptions and sources of uncertainty. In most cases, the LAR concludes that RICT program calculations are not impacted by the modelling uncertainty and no RMAs are required to address the uncertainty. Regarding Items 1 and 4 in Table 1 on development and application of testing and maintenance (T&M) unavailability, there is not enough information for NRC staff to conclude that the assumption or source of modeling uncertainty would not have an impact on the RMTS program. Specifically, from Item 1, the following statement is made:

> "For the average T&M quantification, systems with trains that alternate throughout the year (running (or protected) vs. standby) have been set with Train A running; however, the interpretation in this case is that it is a generic train (similar to the unit alignments), with the understanding that the represented train is alternating throughout the year."

This statement appears to imply that the Comanche Peak PRA model does not model alternate system alignments or account for asymmetries in each train. Because system failure probabilities could be different for alternate system alignments, the quantification of CDF and LERF could be impacted by system alignment assumptions. With regards to this issue, address the following:

a) Clarify how alternate system alignments and system asymmetries are considered in the PRA models for applicable systems and provide justification that these treatments do not underestimate CDF and LERF. If CDF and LERF are underestimated, then justify that this non-conservatism is inconsequential to the RMTS program.

b) The evaluation of the TSTF-505 impact for both Items 1 and 4 state "Average test & maintenance probabilities are substituted in the configuration risk model." Explain the meaning of this statement and justify that the treatment of test and maintenance probabilities in the configuration risk model is in accordance with NEI 06-09.

c) R&R-PN-041, "Sensitivity and Uncertainty," provides the results of sensitivity studies for many sources of modeling uncertainty. While the sensitivity study results do not specifically address the potential impact on the RICT program, there are those that appear to have the potential to impact RICT calculations. Address the following specific uncertainties identified from this report.

   i. Section 5.2.7 identifies that assumptions regarding the operator action to control auxiliary feedwater upon battery depletion can have a significant impact on CDF (the impact on LERF was not evaluated). It is noted that the LAR proposes to include within the scope of the RICT program TSs for the auxiliary feedwater and battery systems, which would appear to further increase the importance of this operator action when systems leading to this scenario are out-of-service. Therefore, address the following:

      1. Provide the bases for concluding that human failure events (HFE) assumptions regarding this operator action are not significant or key to the RICT application. In the response address its importance to all hazards modeled in the PRA (i.e., internal events, internal flood, internal fire).

      2. If, in response to part (1) above, it cannot be determined that the cited assumptions have an inconsequential impact on the estimated RICTs, then identify what programmatic changes will be considered to compensate for this uncertainty and the basis for their consideration (e.g., identification of additional RMAs).

   ii. Section 5.2.10 identifies that the ability to cross-tie the service water and the component cooling systems between units is modeled in the PRA and can have a significant impact on CDF (the impact on LERF was not evaluated). It is noted that the LAR proposes to include within the scope of the RICT program TSs for both the service water and component cooling systems, and that TS 3.7.8.A is specifically for the inoperability of a service water system cross-tie to the other unit. There is no similar TS for the cross-tie of the component cooling system. Therefore, address the following:

1. Provide the bases for concluding that the availability of the component cooling system cross-tie is not significant or key to the RICT application. In the response address its importance to all hazards modeled in the PRA (i.e., internal events, internal flood, internal fire).

2. If, in response to part (1) above, it cannot be determined that the cited assumptions have an inconsequential impact on the estimated RICTs, then identify what programmatic changes will be considered to compensate for this uncertainty and the basis for their consideration (e.g., identification of additional RMAs).

QUESTION 06 – Modeling of RCP Shutdown Seals (APLA)

The NRC staff SE to NEI 06-09, Revision 0, specifies that the LAR should identify key PRA model assumptions and sources of uncertainty and to assess and disposition each as to their impact on the RMTS application.

LAR Enclosure 9 provides a listing of key sources of assumptions and uncertainties for the TSTF-505 application and associated dispositions to each. While not addressed in this enclosure, LAR Enclosure 2 explains that the Comanche Peak PRA model includes modeling of the reactor coolant pump (RCP) shutdown seals (SDSs) in accordance with the NRC-approved version of PWROG-14001-P-A, “PRA Model for the Westinghouse Shutdown Seal,” dated October 2017 (ADAMS Package Accession No. ML18019A190). The NRC safety evaluation (SE) for this topical report, dated August 23,2017 (ADAMS Package Accession No. ML17200A116), identifies limitations and conditions regarding its use in risk-informed applications. LAR Enclosure 2 states that the Comanche Peak PRA models are consistent with PWROG-14001-P-A and addresses all the NRC limitations and conditions. However, while LAR Enclosure 2 specifically addresses Limitations and Conditions #2 and #4, other Limitations and Conditions relevant to risk-informed applications are not addressed. In light of this, address the following:

a) Limitation and Condition #5 specifies that plant-specific human error probabilities (HEPs) are to be developed and factored into the model-of-record and that these are to be provided in risk-informed licensing application submittals.

    i. Provide and justify the HEPs used for the modeling of the RCP SDSs and discuss the uncertainty associated with these HEPs.

    ii. Discuss whether these HEPs are key assumptions or sources of uncertainty for the TSTF-505 application. If not key assumptions or sources of uncertainty, provide justification for this determination.

    iii. If these HEPs are key assumptions or sources of uncertainty, identify appropriate RMAs for these key assumptions consistent with the treatment of key assumptions in NEI 06-09-A, prior to implementation of the RICT program.

b) Limitation and Condition #10 specifies that if the SDS PRA model is used for plant-specific conditions and procedures that are different than typically assumed for Westinghouse plants then a description and justification for this model is to be provided in the risk-informed licensing applications that rely on this model.

    i. Confirm and justify that the Comanche Peak plant-specific conditions and procedures are typical of those for Westinghouse plants.

    ii. If it cannot be justified that the Comanche Peak plant-specific conditions and procedures are typical of those for Westinghouse plants, provide a description of and justification for the Comanche Peak SDS PRA model and its impact on the RICT program.

    iii. If justification cannot be provided for the Comanche Peak SDS model (e.g., that it does not represent a key assumption or source of uncertainty), identify appropriate RMAs prior to implementation of the RICT program.

QUESTION 07 – Digital Instrumentation and Control (I&C) Modeling (APLA)

NEI 06-09 state concerning the quality of the PRA model that “RG 1.174, Revision 1, and RG 1.200, Revision 1 define the quality of the PRA in terms of its scope, level of detail, and technical adequacy. The quality must be compatible with the safety implications of the proposed TS change and the role the PRA plays in justifying the change.”

Regarding digital I&C, NRC staff notes the lack of consensus industry guidance for modeling these systems in plant PRAs to be used to support risk-informed applications. In addition, known modeling challenges exist such as the lack of industry data for digital I&C components, the difference between digital and analog system failure modes, and the complexities associated with modeling software failures including common cause software failures. Also, though reliability data from vendor tests may be available, this source of data is not a substitute for in-the-field operational data. Given these challenges, the uncertainty associated with modeling a digital I&C system could impact the RICT program. However, it is not clear to NRC staff whether the licensee credited digital system in the PRA models that will be used in the RICT program or whether this modelling can impact the RICT calculations. Therefore, address the following:

a) Clarify whether digital I&C systems are credited in the PRA models that will be used in the RICT program.

b) If digital I&C systems are credited in the PRA models that will be used in the RICT program, then justify that the modeling uncertainty associated with crediting digital I&C systems in the PRA models. Describe its impact on the RICT calculations.

QUESTION 08 – Consideration of Shared Systems in RICT Calculations (APLA)

The Tier 3 requirement of RG 1.177 stipulates that a licensee should develop a program that ensures that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity.

LAR Enclosure 2, Section 1.0 states that the internal events PRA model is a combined PRA model that represents both units, that it is a common one-top fault tree having individual basic events for components for both units, and that differences between the two units are activated by flags to produce unit-specific PRA results. The LAR does not explain how the various PRA models address dual unit events for systems or SSCs that are shared between units (e.g., common power buses). NRC staff notes that for certain events such as dual unit events (e.g., loss of offsite power) it may be appropriate to only credit the shared systems for one unit in the RICT calculations. Therefore, address the following:

a) Explain whether shared systems are credited in the internal events, including flood, and fire PRA models for both units and, if so, identify those systems.

b) If shared systems are credited in the Real Time Risk (RTR) model that supports the RICT calculations, then explain how the shared system is modelled for each unit in a dual unit event demonstrating that shared systems are not over-credited in the PRA models.

c) If a shared system is credited in the RTR model that support the RICT calculations and the impact of events that can create a concurrent demand for the system shared by both units is not addressed in the PRA models, then justify that this exclusion has an inconsequential impact the RICT calculations.

QUESTION 09 – Impact of Seasonal Variations (APLA)

The Tier 3 requirement of RG 1.177 stipulates that a licensee should develop a program that ensures that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity. NEI 06-09 and the NRC SE to this guidance state that for the impact of seasonal changes either conservative assumptions should be made or, the PRA should be "adjusted appropriately to reflect the current (e.g., seasonal or time of cycle) configuration."

LAR Enclosure 8 on attributes of the RTR model, Section 2 states: "For systems where some trains are in service and some in standby, the Real-Time Risk Monitor model addresses the actual configuration of the plant including defining in service trains as needed." In LAR Enclosure 9 Table 1, the disposition to ID #5 regarding key sources of modeling assumptions and uncertainties states: "House events are included in the model to specify seasonal conditions (e.g., XHOSCWSUMMER)." Based on this statement, adjustments are made to the RTR model to address the impact of seasonal variations. For example, in the summary of the assumption/uncertainty for ID #5, when the XHOSCWSUMMER event is set to TRUE additional cooling from the vent-chilled water system is required for summer operation. It is not clear to NRC staff whether other modeling adjustments besides this adjustment are needed to account for seasonal dependencies and what kind of adjustments will be made. It is also not clear what criteria is used to know when PRA adjustments due to seasonal variations need to be made in the RTR. Address the following to clarify the treatment of seasonal variations:

a) Discuss the modeling that will be subject to adjustment due to seasonal variations such as hot or cold weather or other environmental factors (e.g., water levels) that can impact the performance of plant systems. Explain what kind of adjustments will be made and clarify whether they will be made conservatively like the adjustments that will be made for heating, ventilation, and air conditioning dependency

b) Explain what criteria (e.g., trigger) are used to know when PRA adjustments due to seasonal variations need to be made in the RTR and justify that this approach is consistent with the guidance in NEI 06-09.

QUESTION 10 – PRA Model Update Frequency (APLA)

The NRC SE to NEI 06-09, Revision 0, specifies that the LAR will provide a discussion of the licensee's programs and procedures which assure the PRA models which support the RMTS are maintained consistent with the as-built, as-operated plant. This NRC SE also specifies that a process must be in place to monitor plant modifications and other changes which may impact the PRA model to assure that the RTR correctly reflects the as-built, as-operated plant. NEI 06-09 specifies that the PRA and configuration risk management tool "shall be maintained and updated in accordance with approved station procedures on a periodic basis not to exceed two refueling cycles."

Section 2.0 of LAR Enclosure 7 states that PRA updates for plant changes are performed at least once every 48 months. In the LAR and LAR Supplement dated July 13, 2021, the justification for this PRA update frequency is that, because the Comanche Peak is a dual unit facility with a common PRA for both units, an update of every 48 months is necessary to ensure that it includes two 18-month refueling cycles for each unit (while not exceeding two refueling cycles on either unit), which are staggered by nine months. The NRC staff notes that increasing trends in the failure of plant components can have an impact on RICT calculations and that one of the units may be more than 50 percent into its third cycle since the last PRA update before the update process is completed. The LAR does not explain if or how increasing trends in component failure rates are tracked for consideration to be incorporated into an interim update of the PRA model or otherwise considered in the RICT program (e.g., via bounding analyses or implementation of appropriate administrative restrictions). Address the following with regards to this concern:

a) Explain how increasing trends in component failure rates are tracked for consideration to be incorporated into an interim update of the PRA model or otherwise considered in the RICT program.

b) If not tracked for potential impact on the RICT program, provide justification that increasing trends in component failure rates have an insignificant impact the RICT program.

QUESTION 11 – In-Scope LCOs and Corresponding PRA Modeling (APLA)

The NRC SE to NEI 06-09 specifies that the LAR should provide a comparison of the TS functions to the PRA modeled functions to show that the PRA modelling is consistent with the licensing basis assumptions or to provide a basis for when there is a difference. LAR Enclosure 1, Table E1-1 identifies each TS LCO proposed for the RICT program, describes whether the systems and components participating in the TS LCO are implicitly or explicitly modeled in the PRA, and compares the design basis and PRA success criteria. For certain TS LCO Conditions, the table explains that the associated SSCs are not modelled in the PRAs but will be represented using a surrogate event that fails the function performed by the SSC. For one LCO conditions, the LAR did not provide enough description for NRC staff to conclude that the PRA modeling will be sufficient for each proposed LCO Condition.

Footnote 9 to LAR Table E1-1 regarding the surrogate modeling for TS LCO 3.4.9.B ("One required group of pressurizer heaters inoperable") states that the RICT impact for this LCO is determined by increasing the likelihood of a plant trip due to degraded pressure control by a factor of 10. Both the LAR and the LAR Supplement dated July 13, 2021, further clarify that the pressurizer heaters do not perform a significant accident mitigation function, are not credited for accident mitigation in the safety analyses, are not required for mitigation of steam generator tube rupture, and therefore do not have a quantifiable impact on CDF or LERF. However, neither the LAR or LAR supplement provide justification that increasing the likelihood of a plant trip is a reasonable surrogate or that increasing this likelihood by a factor of 10 is conservative for determining the impact on CDF and LERF from implementing a RICT. Address the following:

a) Provide justification that increasing the likelihood of a plant trip is a reasonable surrogate for determining the RICT for this LCO.

b) Provide justification that increasing the likelihood of a plant trip by a factor of 10 provides a conservative estimate of the RICT for this LCO.

QUESTION 12 - Performance Monitoring (APLA)

Key Principle 5 of RG 1.177, Revision 1, pertains to performance monitoring. The RG states:

> The licensee should consider implementation and performance monitoring strategies formulated to ensure (1) that no adverse safety degradation occurs because of the changes to the TS and (2) that the engineering evaluation conducted to examine the impact of the proposed changes continues to reflect the actual reliability and availability of TS equipment that has been evaluated. This will ensure that the conclusions that have been drawn from the evaluation remain valid. […]

Similarly, RG 1.174, Revision 3 provides guidance of implementation and monitoring program for any risk-informed licensing basis changes:

> The licensee should propose monitoring programs that adequately track the performance of equipment that, when degraded, can affect the conclusions of the licensee's engineering evaluation and integrated decision-making that support the change to the licensing basis. The program should be capable of trending equipment performance after a change has been implemented to demonstrate that performance is consistent with the assumptions in the traditional engineering and probabilistic analyses conducted to justify the change. […] The program should be structured such that (1) SSCs are monitored commensurate with their safety importance […], (2) feedback of information and corrective actions is timely, and (3) degradation in SSC performance is detected and corrected before plant safety can be compromised. [...]

LAR Attachment 1, Section 2.3 states that the application of a RICT will be evaluated using the guidance provided in NEI 06-09, Revision 0-A, “Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines." The LAR further states:

> …the NEI 06-09, Revision 0 methodology satisfies the five key safety principles specified in Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decision-making: Technical Specifications," dated August 1998 (ADAMS Accession No. ML003740176), relative to the risk impact due to the application of a RICT.

The LAR did not provide sufficient information to explain how the RICT Program satisfies the fifth key safety principle of RG 1.177 and RG 1.174, specifically with respect to the ability of the monitoring program to adequately track the performance of equipment in a timely fashion, so that if degraded, its degraded performance will be considered in the licensee’s RICT evaluations.

Therefore, provide a description of the performance monitoring strategies proposed for the RICT program and justify how the program meets key principle 5 of RG 1.177 and RG 1.174. Include description and justification on:

a) Whether and how SSCs are monitored commensurate with their safety importance

b) The timeliness of the feedback of information and corrective actions

c) How degradation in SSC performance is detected and corrected before plant safety can be compromised

d) How it is ensured that the PRA used in the RICT program continues to reflect the actual reliability and availability of TS equipment.

QUESTION 13 – Cumulative Risk Calculation Frequency (APLA)

The NRC SE to NEI 06-09, Revision 0, specifies that a periodic assessment of the risk incurred due to the extension of CTs is required. This is an evaluation of the calculated change in risk after implementation of a RMTS program to assure that the guidance of RG 1.174 for small risk changes [e.g., delta CDF (1E-5 per year) and delta LERF (1E-6 per year)] are met. NEI 06-09 specifies that the cumulative risk assessment “shall be conducted every refueling cycle on a periodicity not to exceed 24 months.” This guidance is clear in that the cumulative risk is to be calculated after each refueling cycle and for each unit for multi-unit plants.

Section 2.0 of LAR Enclosure 11 states that the calculation of cumulative risk impact will be conducted “at least once every 48 months as part of the periodic review and update of the PRA models.” This periodicity is inconsistent with the guidance in NEI 06-09 and does not appear to meet the guidance of RG 1.174, Revision 3. Address the following with regards to this concern:

a) Provide justification that the periodicity of once every 48 months is in accordance with NEI 06-09. In the response specifically address how this periodicity provides assurance that the RG 1.174, Revision 3, risk guidelines are met.

b) Explain how cumulative risk will be calculated for each of the Comanche Peak units.

QUESTION 14 – Open Phase Condition (APLA)

Section C.1.4 of RG 1.200 states the base (e.g., Model of Record) PRA is to represent the as-built, as-operated plant to the extent needed to support the application. The licensee is to have a process that identifies updated plant information that necessitate changes to the base PRA model.

In response to the January 30, 2012, Open Phase Condition (OPC) event at the Byron Generating Station, the NRC issued Bulletin 2012-01.[1] As part of the initial Voluntary Industry Initiative (VII) for mitigation of the potential for the occurrence of an OPC in electrical switchyards[2], licensees have made the addition of an Open Phase Isolation System (OPIS). As per SRM-SECY-16-0068[3], the NRC staff was directed to ensure that licensees have appropriately implemented OPIS and that licensing bases have been updated accordingly. Inspections of OPIS by NRC staff are currently underway. From the revised voluntary initiative[4] and resulting industry guidance in NEI 19-02[5] on estimating OPC and OPIS risk, it is understood that the risk impact of an OPC can vary widely dependent on electrical switchyard configuration and design. In light of these observations, provide the following information:

a) Discuss Comanche Peak's evaluation of the risk impact associated with OPC events including the likelihood of OPC initiating plant trips and the impact of those trips on PRA-modeled SSCs. Also, explain whether an OPIS has been installed at Comanche Peak and if it has been installed, then discuss its functionality and any operator actions needed to operate the system or needed in response to the system.

b) Clarify whether any installed OPIS equipment and associated operator actions are credited in the PRAs that support this application. If OPIS equipment and associated operator actions are credited, then provide the following information:

   i. Describe the OPIS equipment and associated actions that are credited in the PRA models.

   ii. Describe the impact that this treatment, if any, has on key assumptions and sources of uncertainty for the categorization process.

   iii. Discuss human reliability analysis (HRA) methods and assumptions used for crediting OPIS alarm manual response.

---

[1] U.S. NRC Bulletin 2012-01, , "Design Vulnerability in Electric Power System" (ADAMS Accession No. ML12074A115).

[2] Anthony R. Pietrangelo to Mark A. Satorius, Ltr re: "Industry Initiative on Open Phase Condition - Functioning of Important-to-Safety Structures, Systems and Components (SSCs)", dated October 9, 2013 (ADAMS Accession No. ML13333A147).

[3] U.S. NRC SRM-SECY-16-0068, "Interim Enforcement Policy For Open Phase Conditions In Electric Power Systems For Operating Reactors," dated March 9, 2017 (ADAMS Accession No. ML17068A297).

[4] Doug True to Ho Nieh, Ltr re: "Industry Initiative on Open Phase Condition, Revision 3", dated June 6, 2019 (ADAMS Accession No. ML19163A176)

[5] Nuclear Energy Institute (NEI) 19-02, "Guidance for Assessing Open Phase Condition Implementation Using Risk Insights", Revision 0, April 2019 (ADAMS Accession No. ML19122A321).

iv. Discuss how OPC related scenarios are modelled for non-internal event scenarios such as fire, seismic, flooding, high winds, tornado, and other external events.

v. Regarding inadvertent OPIS actuation:

1. Explain whether scenarios regarding inadvertent actuation of the OPIS, if applicable, are included in the RTR model that supports the RICT calculations.

2. If inadvertent OPIS actuation scenarios are not included in the PRA models, then provide justification that the exclusion of this inadvertent actuation does not impact the RICT calculations.

c) If OPC and OPIS are not included in the application PRA models (whether OPIS equipment is installed or not), then provide justification the exclusion of this failure mode and mitigating system does not impact the RICT calculations.

d) As an alternative to Part (c), propose a mechanism to ensure that OPC-related scenarios are incorporated into the application PRA models prior to implementing the RICT program.

QUESTION 15 – Update of Fire PRA with Internal Event Facts and Observations (F&O) Resolutions (APLB)

RG 1.200, Revision 3 provides guidance for addressing PRA acceptability. RG 1.200, Revision 3, describes a peer review process using the ASME/ANS PRA standard as one acceptable approach for determining the technical acceptability of the PRA. The primary results of peer review are the F&Os recorded by the peer review team and the subsequent resolution of these F&Os. A process to close finding-level F&Os is documented in Appendix X titled "NEI 05-04/07-12/12-06 Appendix X: Close-out of Facts and Observations (F&Os)," dated February 21, 2017(ADAMS Package Accession No. ML17086A431), to the Nuclear Energy Institute (NEI) guidance documents NEI 05-04, NEI 07-12, and NEI 12- 13, which was accepted by the NRC in a letter dated May 3, 2017 (ADAMS Accession No. ML17079A427).

LAR Enclosure 2, Section 3 states that an Independent Assessment was performed in 2019 to closeout internal events PRA F&Os after the model was updated to resolve F&Os from the 2011 full-scope peer review. LAR Enclosure 2, Section 4 states that the last full-scope peer review of the fire PRA was performed in 2016 which is before the internal events PRA F&O closure review in 2019. The LAR does not indicate when the modeling updates to the internal events PRA to resolve F&Os occurred and whether applicable modeling updates were also performed for the fire PRA. Given that internal events PRA provides the modeling foundation for the fire PRA, it is not clear to NRC staff whether F&O resolutions made to the internal events PRA to close F&Os that could impact the fire PRA were incorporated into the fire PRA. Therefore, address the following:

a) Confirm that all internal events PRA modeling updates performed to resolve F&Os that could impact fire risk were incorporated into the fire PRA.

b) If it cannot be confirmed in response to part (a) above that all internal events modeling updates performed to resolve F&Os that could impact fire risk were incorporated into the fire PRA, then propose a mechanism that ensures that all internal events modeling updates performed to resolve F&Os that could impact fire risk are incorporated into the fire PRA prior to implementation of the RICT program. Alternatively, justify that all the internal events modeling updates performed to resolve F&Os have an inconsequential impact on the RICT calculations.

QUESTION 16 – Deviations from NRC Endorsed Guidance as Source of Modeling Uncertainty (APLB)

RG 1.200 states “NRC reviewers, [will] focus their review on key assumptions and areas identified by peer reviewers as being of concern and relevant to the application.” The relatively extensive and detailed reviews of fire PRAs undertaken in support of LARs to transition to NFPA-805 determined that implementation of some of the complex fire PRA methods often used non-conservative and over-simplified assumptions to apply the method to specific plant configurations. Some of these issues were not always identified in F&Os by the peer review teams but are considered potential key assumptions by the NRC staff because using more defensible and less simplified assumptions could substantively affect the fire risk and fire risk profile of the plant. The NRC staff evaluates the acceptability of the PRA for each new risk-informed application and as discussed in RG 1.174, recognizes that the acceptable technical adequacy of risk analyses necessary to support regulatory decision-making may vary with the relative weight given to the risk assessment element of the decision-making process. The NRC staff notes that the calculated results of the PRA are used directly to calculate a RICT which subsequently determines how long SSCs (both individual SSCs and multiple, unrelated SSCs) controlled by TSs can remain inoperable. Therefore, the PRA results are given a very high weight in a TSTF-505 application and the NRC staff requests additional information on the following issues that have been previously identified as potentially key fire PRA assumptions.

<u>Use of Unacceptable Methods</u>

a) The LAR provides the history of the fire PRA peer review but does not discuss methods used in the fire PRA. Methods may have been used in the fire PRA that deviate from guidance in NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," (ADAMS Accession Nos. ML052580075, ML052580118, and ML103090242), or other acceptable guidance (e.g., frequently asked questions (FAQs), NUREGs, or interim guidance documents).

    i. Identify methods used in the fire PRA that deviate from guidance in NUREG/CR-6850 or other acceptable guidance.

    ii. If such deviations exist, then justify their use in the fire PRA and impact on the RICT.

    iii. As an alternative to part (ii) above, add an implementation item to replace those methods with a method acceptable to NRC prior to the implementation of the RICT Program. Include a description of the replacement method along with justification that it is consistent with NRC accepted guidance.

Reduced Transient Heat Release Rates (HRRs)

b) The key factors used to justify using transient fire reduced HRRs below those prescribed in NUREG/CR-6850 are discussed in the June 21, 2012, letter from Joseph Giitter, U.S. Nuclear Regulatory Commission, to Biff Bradley, NEI, "Recent Fire PRA Methods Review Panel Decisions and EPRI 1022993, Evaluation of Peak Heat Release Rates in Electrical Cabinet Fires," (ADAMS Accession No. ML12172A406).

If any reduced transient HRRs below the bounding 98 percent HRR of 317 kW from NUREG/CR-6850 were used, discuss the key factors used to justify the reduced HRRs. Include in this discussion:

i. Identification of the fire areas where a reduced transient fire HRR is credited and what reduced HRR value was applied.

ii. A description for each location where a reduced HRR is credited, and a description of the administrative controls that justify the reduced HRR including how location-specific attributes and considerations are addressed. Include a discussion of the required controls for ignition sources in these locations and the types and quantities of combustible materials needed to perform maintenance. Also, include discussion of the personnel traffic that would be expected through each location.

iii. The results of a review of records related to compliance with the transient combustible and hot work controls.

Treatment of Sensitive Electronics

c) FAQ 13-0004, “Clarifications on Treatment of Sensitive Electronics” (ADAMS Accession No. ML13322A085) provides supplemental guidance for application of the damage criteria provided in Sections 8.5.1.2 and H.2 of NUREG/CR-6850, Volume 2, for solid-state and sensitive electronics.

i. Describe the treatment of sensitive electronics for the fire PRA and explain whether it is consistent with the guidance in FAQ 13-0004, including the caveats about configurations that can invalidate the approach (i.e., sensitive electronics mounted on the surface of cabinets and the presence of louver or vents).

ii. If the approach cannot be justified to be consistent with FAQ 13-0004, then justify that the treatment of sensitive electronics has no consequential impact on the RICT calculations.

iii. As an alternative to part (ii) above, add an implementation item to replace the current approach with an acceptable approach prior to the implementation of the RICT Program. Include a description of the replacement method along with justification that it is consistent with NRC accepted guidance.

<u>Minimum Joint Human Error Probability</u>

d) NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Analysis Guidelines- Final Report," (ADAMS Accession No. ML12216A104), discusses the need to consider a minimum value for the joint probability of multiple HFEs in HRAs.

NUREG-1921 refers to Table 2-1 of NUREG-1792, "Good Practices for Implementing Human Reliability Analysis (HRA)," (ADAMS Accession No. ML051160213), which recommends that joint HEP values should not be below 1E-5. Table 4-4 of EPRI 1021081, "Establishing Minimum Acceptable Values for Probabilities of Human Failure Events," provides a lower limiting value of 1E-6 for sequences with a very low level of dependence. Therefore, the guidance in NUREG-1921 allows for assigning joint HEPs that are less than 1E-5, but only through assigning proper levels of dependency.

The LAR does not provide this information and does not explain what minimum joint HEP value is currently assumed in the fire PRA. Also, even if the assumed minimum joint HEP values are shown to have no impact on the current fire PRA risk estimates, it is not clear to the NRC staff how it will be ensured that the impact remains minimal for future PRA model revisions. In light of these observations:

i. Explain what minimum joint HEP value was assumed in the fire PRA.

ii. If a minimum joint HEP value less than 1E-05 was used in the fire PRA, then provide a description of the sensitivity study that was performed and the quantitative results that justify that the minimum joint HEP value has an inconsequential impact on the RICT application.

iii. If, in response part (b), if it cannot be justified that the minimum joint HEP value has no impact on the application, then provide the following:

1. Confirm that each joint HEP value used in the fire PRA below 1E-5 includes its own justification that demonstrates the inapplicability of the NUREG-1792 lower value guideline (i.e., using such criteria as the dependency factors identified in NUREG-1921 to assess level of dependence). Provide an estimate of the number of these joint HEP values below 1.0E-5, discuss the range of values, and provide at least two different examples where this justification is applied.

2. If joint HEP values used in the fire PRA below 1E-5 cannot be justified, add an implementation item to set these joint HEPs to 1E-5 in the fire PRA prior to the implementation of the RICT Program.

<u>Obstructed plume model</u>

e) NUREG-2178, “Refining And Characterizing Heat Release Rates From Electrical Enclosures During Fire (RACHELLE-FIRE), Volume 1, “Peak Heat Release Rates and Effect of Obstructed Plume,” dated April 2016 (ADAMS Accession No. ML16110A140), contains refined peak HRRs, compared to those presented in NUREG/CR-6850, and guidance on modeling the effect of plume obstruction. Additionally, NUREG-2178 provides guidance that indicates that the obstructed plume model is not applicable to cabinets in which the fire is assumed to be located at elevations of less than one-half of the cabinet.

i. If obstructed plume modeling was used, then indicate whether the base of the fire was assumed to be located at an elevation of less than one-half of the cabinet.

ii. Justify any modeling in which the base of an obstructed plume is located at less than one-half of the cabinet's height.

iii. As an alternative to part (ii) above, add an implementation item to remove credit for the obstructed plume model in the fire PRA prior to the implementation of the RICT program.

Systems not Credited in the Fire PRA

f) CN-RAM-13-038, "Qualitative Screening, Quantitative Screening, Quantification, and Uncertainty Analysis for CPNPP Fire PRA," on the portal states: "If the location of equipment and cables is not known, then the equipment and its cables are assumed failed." As expected, the results of the sensitivity study in Section 5.5.1.1 assuming these equipment never fail show a significant decrease in fire CDF and LERF.

However, the NRC staff notes that some conservative PRA modeling could have a nonconservative impact on the RICT calculations. If an SSC is part of a system not credited in the fire PRA or it is supported by a system that is assumed to always fail, then the risk increases due to taking that SSC out of service is masked. Therefore, address the following:

i. Identify the systems or components that are assumed to be always failed in the fire PRA, or are not included in the fire PRA, due to lack of cable tracing or other reasons.

ii. Justify that this assumption has an inconsequential impact on the RICT calculations.

iii. If, in response to part (ii) above, it cannot be determined that the cited assumption has an inconsequential impact on the estimated RICTs, then identify what programmatic changes will be considered to compensate for this uncertainty and the basis for their consideration (e.g., identification of additional RMAs).

Well-Sealed Motor Control Center (MCC) cabinets

g) Guidance in FAQ 08-0042 from Supplement 1 of NUREG/CR-6850 applies to electrical cabinets below 440 V. With respect to Bin 15 as discussed in Chapter 6, it clarifies the meaning of "robustly or well-sealed." Thus, for cabinets of 440V or less, fires from well-sealed cabinets do not propagate outside the cabinet. For cabinets of 440 V and higher, the original guidance in Chapter 6 remains and requires that Bin 15 panels which house circuit voltages of 440 V or greater are counted because an arcing fault could compromise panel integrity (an arcing fault could burn through the panel sides, but this should not be confused with the high energy arcing fault type fires)." Fire PRA FAQ 14-0009, "Treatment of Well-Sealed MCC Electrical Panels Greater than 440V" (ADAMS

Accession No. ML15119A176) provides the technique for evaluating fire damage from MCC cabinets having a voltage greater than 440V. Therefore, propagation of fire outside the ignition source panel must be evaluated for all MCC cabinets that house circuits of 440 V or greater.

i. Describe how fire propagation outside of well-sealed MCC cabinets greater than 440 V is evaluated.

ii. If well-sealed cabinets less than 440 V are included in the Bin 15 count of ignition sources, provide justification for using this approach as this is contrary to the guidance.

Transient Fire Influencing Factors

h) NUREG/CR-6850 Section 6 and FAQ 12-0064 "Hot Work/Transient Fire Frequency Influence Factors" (ADAMS Accession No. ML12346A488) describe the process for assigning influence factors for hot work and transient fires. Provide the following regarding application of this guidance:

i. Indicate whether the methodology used to calculate hot work and transient fire frequencies applies influencing factors using NUREG/CR-6850 guidance or FAQ 12-0064 guidance.

ii. Indicate whether administrative controls are used to reduce transient fire frequency, and if so, describe and justify these controls.

iii. Indicate whether Comanche Peak has any combustible control violations and discuss the treatment of these violations for the assignment of transient fire frequency influence factors. For those cases where Comanche Peak has violations and have assigned an influence factor of 1 (Low) or less, indicate the value of the influence factors assigned and provide justification.

iv. If an influencing factor of "0" to Maintenance, Occupancy, or Storage, or Hot Work for any fire physical analysis units (PAUs) has been assigned, then provide justification.

v. If a weighting factor of "50" was not used in any fire PAU, provide a sensitivity study that assigns weighting factors of "50" per the guidance in FAQ 12-0064.

i) Fire Scenario Treatment of the Main Control Board

Traditionally, the cabinets on the front face of the Main Control Board (MCB) have been referred to as the MCB for purposes of fire PRA. Appendix L of NUREG/CR-6850, provides a refined approach for developing and evaluating those fire scenarios. Fire PRA FAQ 14-0008, "Main Control Board Treatment," dated July 22, 2014 (ADAMS Accession No. ML14190B307), clarifies the definition of the MCB and effectively provides guidance for when to include the cabinets on the back side of the MCB as part of the MCB for fire PRA. It is important to distinguish between MCB and non-MCB cabinets because misinterpretation of the configuration of these cabinets can lead to incomplete or incorrect fire scenario development. This FAQ also provides several alternatives to NUREG/CR-6850 for using Appendix L to treat partitions in an MCB enclosure. Therefore, address the following:

i. Briefly describe the main control room MCB configuration and use the guidance in FAQ 14-0008 to determine whether cabinets on the rear side of the MCB are a part of the MCB.

ii. If the cabinets on the rear side of the MCB are part of a single integral MCB enclosure using the definition in FAQ 14-0008, then confirm that guidance in FAQ 14-0008 was used to develop fire scenarios in the MCB and determine the frequency of those scenarios.

iii. If the cabinets on the rear side of the MCB are part of a single integral MCB enclosure and the guidance in FAQ 14-0008 was not used to develop fire scenarios involving the MCB, then provide a description of how the fire scenarios for the backside cabinets are developed and an explanation of how the treatment aligns with NRC accepted guidance.

iv. If in response to parts (i and ii) above, the current treatment of the MCB and those cabinets on the rear side of the MCB cannot be justified using NRC accepted guidance, then justify that the treatment has no impact on the RICT calculations.

<u>PRA Treatment of Fire Dependencies Between Units 1 and 2</u>

j) Many plants have Unit 1 and 2 adjoined and thus have common areas. For these plants, the risk contribution from fires originating in one unit must be addressed for impacts to the other unit given the physical proximity of the other unit and common areas. Therefore, address the following if Units 1 and 2 have common areas and shared systems.

i. Explain how the risk contribution of fires originating in one unit is addressed for the other unit given impacts due to the physical proximity of equipment and cables in one unit to equipment and cables in the other unit. Include identification of locations where fire in one unit can affect components in the other unit and explain how the risk contributions of such scenarios are allocated in the LAR.

ii. Explain how the contributions of fires in common areas are addressed, including the risk contribution of fires that can impact components in both units.

QUESTION 17 – Determination of Seismic CDF and LERF "Penalty" (APLC)

Section 2.3.1, Item 7, of NEI 06-09, Revision 0-A, states that the "impact of other external events risk shall be addressed in the RMTS program," and explains that one method to do this is by "a reasonable bounding analysis and applying it along with the internal events risk contribution in calculating the configuration risk and the associated RICT." The NRC staff's SE for NEI 06-09 states that "[w]here PRA models are not available, conservative or bounding analyses may be performed to quantify the risk impact and support the calculation of the RICT."

LAR Enclosure 4, Section 3 presents the details of an approach for determining the seismic "penalty." The calculated seismic CDF (SCDF) was then adjusted using the Comanche Peak Plant Availability Factor of 0.94. Given that the plant is operating during implementation of RICTs, adjusting the SCDF and seismic LERF (SLERF) by the plant availability factor does not appear to be appropriate. Furthermore, this adjustment is inconsistent with the process to translate the baseline PRA model for use in the configuration risk model (i.e., RTR model) wherein the plant availability factor is set to 1.0 (see LAR Enclosure 8 Section 2).

a) Provide justification for adjusting the bounding SCDF and SLERF estimates by the plant availability factor. If justification cannot be provided, provide updated bounding SCDF and SLERF values to be used in the RICT calculations.

b) Provide the justification that the plant baseline risk is not impacted by seismic events. If the justification cannot be provided, adjust the baseline SCDF and SLERF for both units.

Table E4-1 of Enclosure 4 to the LAR provides seismic bounding analysis results and shows baseline SCDF and SLERF are 0 per year for both units. It is unclear why calculated SCDF and SLERF are not considered as the baseline risk for the RICT program. There is no justification provided for this selection in the LAR. Table 1 of LTR-RAM-20-45 "Seismic Hazard Analysis to Support Comanche Peak RICT LAR," provided by the licensee on the portal indicates that SCDF and seismic delta CDF are the same, and SLERF and delta SLERF are the same. It appears that these two tables are not consistent.

c) Explain the inconsistency between the values in Table E4-1 of Enclosure 4 to the LAR and Table 1 of LTR-RAM-20-45, and explain which values are being used for your analysis.

QUESTION 18 – Determination of the High Winds CDF and LERF "Penalty" (APLC)

Section 2.3.1, Item 7, of NEI 06-09, Revision 0-A, states that the "impact of other external events risk shall be addressed in the RMTS program," and explains that one method to do this is by "performing a reasonable bounding analysis and applying it along with the internal events risk contribution in calculating the configuration risk and the associated RICT." The NRC staff's SE for NEI 06-09 (ADAMS Accession No. ML071200238) states that "[w]here PRA models are not available, conservative or bounding analyses may be performed to quantify the risk impact and support the calculation of the RICT."

Enclosure 4 to the LAR states that the Comanche Peak high winds PRA model was used to calculate the conditional core damage probability (CCDP) and conditional large early release probability (CLERP). The licensee did not discuss the background of the high winds PRA model and if it was peer reviewed or not. However, the licensee's further discussion on the sequence CCDP and CLERP baselines indicates that the CCDP and CLERP are obtained by quantifying the Comanche Peak internal events PRA model.

a) Discuss whether the high wind CCDP and CLERP are obtained by quantifying Comanche Peak internal events PRA model, or high winds PRA model. If it is by high winds PRA model, discuss the model and its acceptability.

The LAR did not provide sufficient information on the development of certain of the inputs to the high winds penalty estimates for the NRC staff to conclude that the methodology does not result in non-conservative RICTs. Therefore, the NRC staff requests additional information on the following topics regarding the methodology and results:

b) The LAR does not explain how the mean hazard frequencies were developed for each of the 10 tornado wind speed intervals and for each of the 10 straight wind speed intervals. Address the following:

    i. Provide the mean hazard frequencies used in the analysis.

    ii. Describe how the mean hazard frequencies were developed and justify the source(s) of the wind data used to develop the frequencies. Specifically address how the frequencies are applicable to the Comanche Peak site and how these have been updated since the Comanche Peak Individual Examination of External Events (IPEEE).

    iii. Discuss uncertainties associated with the development of these frequencies and their potential impact on the RICT application.

c) Neither the LAR nor LTR-RAM-20-99 on the portal explain the technical basis for the conditional loss of offsite power (LOOP) probabilities developed for each of the 10 tornado wind speed intervals and for each of the 10 straight wind speed intervals using engineering judgement. Address the following:

    i. Provide the conditional LOOP probabilities used for each wind speed interval.

    ii. Provide the basis for each of the probabilities and justify that these probabilities will not result in non-conservative RICTs.

    iii. LAR Enclosure 9 Table 1 ID #11 identifies theses probabilities as a key source of uncertainty. The implication of the disposition to this uncertainty item is that the conservative assumption of no LOOP recovery for all wind speed intervals offsets any potential non-conservatism in the probabilities. Provide justification that the conservative assumption of no LOOP recovery for all wind speed intervals outweighs any potential non-conservatisms in the determination of the high winds penalty.

    iv. LTR-RAM-20-99 on the portal provides the results of a sensitivity analysis assuming the conditional loop probabilities are increased by a factor of 10 for all wind speed intervals, which shows that the high winds CDF and LERF penalties correspondingly increase by a factor of 10. However, it is noted in Table 7-1 of this report that the increased probabilities for several wind speed intervals are greater than 1.0.

        1. Provide justification for the use of probabilities greater than 1.0 and that the sensitivity analysis results are realistic.

        2. If justification cannot be provided, provide revised results for the sensitivity analysis.

d) The LAR does not explain why the seven equipment out of service (OOS) conditions identified in Table E4-2 adequately encompass the potential impact of high winds events on the RICT program. Neither the LAR explain how it was determined which basic events in the internal events PRA were deemed to be vulnerable to high wind damage. Address the following:

i. Provide justification for not including other equipment OOS conditions, and why not including other equipment OOS conditions is not significant to the determination of RICTs.

ii. Discuss whether there are other potential equipment OOS conditions involving equipment from more than just one system being OOS (e.g., an emergency diesel generator and turbine-drive auxiliary feedwater), and how these multiple OOS conditions are considered in the development of the high winds CDF and LERF penalties.

iii. Explain how it was determined which internal events PRA basic events were deemed vulnerable to high wind damage and included in the determination of the high winds CDF and LERF penalties. In the response, address how dependencies and tornado-missile damage are accounted for in identifying the vulnerable basic events.

e) The LAR explains that Table E4-4 of Enclosure 4 provides the high winds penalty to be used in RICT calculations. However, Table E4-4 provides two columns each for SCDF and SLERF, one column titled baseline and one column titled delta risk. Please clarify that SCDF is a typo for high wind (HW) CDF and SLERF is a typo for HW LERF. If not, please explain SCDF and SLERF.

f) Footnote 2 to Table 1 in LAR Enclosure 5 states “the baseline high winds CDF and LERF are developed and are representative of a penalty factor. The high winds penalty is procedurally adjusted based on the component(s) to which the RICT is applied.” It is unclear to the NRC staff how the results in Table E4-4 of applied in RICT calculations.

i. Clarify how the information in Table E4-4 is used to apply a high winds penalty in RICT calculations.

ii. Justify that this application addresses the risk of high wind events in all RICT calculations.

iii. Specifically address how these calculations are performed in the RTR tool.

g) The baseline values for high winds CDF and LERF provided in Table E4-4 are 4.09E-06 per year and 2.35E-07 per year, respectively. The baseline values for high winds CDF and LERF provided in Enclosure 5 Table 1 are 3.85E-06 per year and 2.21E-07 per year, respectively. Explain the differences between these two sets of results and justify the values to be used as penalty factors in the RICT program.

h) If any of the responses to the previous questions result in updates to the high winds penalty results, provide the updated penalties.

QUESTION 19 – Configuration Specific Considerations for External Hazards (APLC)

In Table E4-6 of Enclosure 4 to the LAR, the licensee provided the external hazards screening. In Section 4 of Enclosure 4 to the LAR, the licensee stated that particular plant configurations could impact the decision on whether a particular hazard that screens under the normal plant configuration and concluded that there are no configuration specific considerations related to the screening assessment provided for the normal plant alignment.

a) Confirm that all external hazards can be screened out without any configuration specific considerations.

b) Discuss how the configuration specific considerations are systematically evaluated and documented for the external hazards that may impact on the RICT program.

QUESTION 20 – Shared Electrical Equipment (EEEB)

Please identify any electrical equipment that is shared between the units and clarify whether that shared equipment is modeled in PRA.

QUESTION 21 – Potential Electrical Loss of Function (LOF) (EEEB)

As part of its TSTF-505 review, the NRC staff examines each proposed TS condition for the potential LOF. One method to do that is reviewing the design success criteria (DSC) the licensee provided in the LAR. The DSC is a minimum set of remaining equipment required to perform the safety function. The DSC must demonstrate that the proposed change will not result in a LOF. The staff notes that the following DSC in Table E1-1 of Enclosure 1 of the LAR do not reflect the criteria of DSC and therefore, raise the concern of the potential LOF.

a) TS 3.8.1 Condition F is “One SI sequencer is inoperable.” The DSC in Table E1-1 for this TS condition is “See LCO 3.8.1.B.” LCO 3.8.1.B is for “One DG is inoperable.” Clarify or correct this DSC information in the Table.

b) TS Condition 3.8.4.A is “One or two required battery chargers on one train inoperable.” The DSC in Table E1-1 for this TS condition is “One 100% capacity battery for one of two DC trains.” TS Condition 3.8.4.A is a TS condition related to battery charger inoperability, but the DSC in Table E1-1 describes the battery. Clarify or correct this DSC information in the Table.

QUESTION 22 – Modeling of Turbine Driven Auxiliary Feedwater (TDAFW) Pump (EEEB)

TS 3.8.1 Conditions A, B, and C have the following Note:

--------------------NOTE--------------------
In MODES 1, 2 and 3, the TDAFW
pump is considered a required
redundant feature.

Clarify whether the TDAFW pump is modeled in the PRA when TS 3.8.1.A/B/C is in RICT.

QUESTION 23 – Batteries (EEEB)

TS 3.8.4.B is "One or two batteries on one train inoperable." In Table E1-1, the DSC for TS 3.8.4.B is "One battery available for one of two DC [direct current] trains." Please clarify the capacity of the battery and the number of DC trains required to safe shutdown of a unit.

QUESTION 24 –Electrical Risk Management Actions (RMAs) (EEEB)

Enclosure 12 of the LAR provides RMA examples for offsite source, diesel generator (DG), and battery charger inoperable. Provide the RMA examples for the alternating current (AC) and DC distribution systems inoperable.

QUESTION 25 – Loss of Power (LOP) Instrumentation (EICB)

TSTF-505 Revision 2 specifies that "Required Actions associated with Conditions that represent a TS loss of specified safety function are outside the scope of this traveler. " The LOF is a condition that such a specific item cannot perform its function described in the Comanche Peak design basis documents. Further, the existence and operability of a diversity to this item does not exclude this condition from LOF. The equipment needed to meet this function should be listed in LAR, Enclosure 1, Table E1-1, in the "Design Success Criteria" column

TSTF-505 Revision 2 traveler for the Westinghouse Standard Technical Specifications (STS) for TS 3.3.5 assumes the LOP design consists of 3 channels per bus with a logic of 2 out of 3. The Comanche Peak LOP design appears to have several differences from the STS design, including two channels per bus with a 2 out of 2 logic. The NRC staff suggests that the STS is not applicable in this case, and the application of RICT and LOF screening to LCO 3.3.5 needs to be evaluated. Please be prepared to discuss the design of the Comanche Peak LOP system, and the sequence of events of how LOP system is actuated, and scenarios under each LCO 3.3.5 conditions and actions. In particular, please respond to the following questions (all page references are to the LAR supplement submitted July 13, 2021:

a. Please clarify all LOP functions consist of 2 sensing relays (or channels) per bus with a logic of 2 out of 2.

b. On page 4 of the Executive Summary, in the discussion of Condition 3.3.5.F, last paragraph, "This is only a loss of safety function if all AC sources are declared inoperable." Please explain how many sources and buses on which the LOP is deployed.

c. On page 9 of the Executive Summary, in the discussion of Condition 3.3.5.E, the first paragraph states in part, ""Two channels per bus" is acceptable as each bus must have both channels to initiate the start signal for the DG in Conditions B, C, D, or E. Condition F allows for 1 hour to restore Automatic Actuation Logic and Actuation Relays train(s) whether one or both trains are inoperable." Please clarify what does these sentences mean.

d. On page 9 of the Executive Summary, in the discussion of Condition 3.3.5.E, first paragraph states in part, "If both buses are found to be inoperable per Conditions B, C, D, or E then actions for the inoperable source or bus will be required." Please confirm that Conditions B, C, D or E discuss the number of channels per bus, not the number of buses; and clarify what does the "buses" means in the statement, and how many buses are in a unit?

e. On page 9 of the Executive Summary, in the discussion of Condition 3.3.5.E, first paragraph states in part, "If the transfer fails, or if the Alternate offsite power source is not available, the diesel generators are started to energize the 6.9kV Class 1 E buses." Please clarify this transfer process, and what relays and logics are involved in this process, and the scenarios under one or more relay or logic channels or functions inoperable.

f. On page 7 of Attachment 1, in the discussion of Condition 3.3.5.C, the first paragraph states, "The requirements of TS 3.3.5, Action B.1 currently allow for 1 hour to restore one channel per bus to OPERABLE status. This will result in at least one operable sensing relay per bus. The 1 hour Completion Time should allow ample time to repair most failures and takes into account the low probability of an event requiring a loss of power (LOP) start occurring during this interval." If ACTION 3.3.5.B.1 enters the RICT, this interval will be extended from 1 hour to potentially 30 days. Please clarify the basis for 30 days when the justification for the variation is for 1 hour.

g. On page 7 of Attachment 1, in the discussion of Condition 3.3.5.C, the second paragraph states in part, "If the Preferred offsite power source is lost, the 6.9kV Class 1 E buses are automatically energized from the Alternate offsite power source." Please confirm which LOP functions are required to complete this transfer.

h. On page 7 of Attachment 1, in the discussion of Condition 3.3.5.C, the second paragraph states in part, "If the transfer fails, or if the Alternate offsite power source is not available, the diesel generators are started to energize the 6.9kV Class 1 E buses." Please clarify how operators know whether this transfer fails or the Alternate offsite power source is not available.

i. On page 7 of Enclosure 1, Section 4.3 in the discussion of Condition 3.3.5.C, the fourth paragraph states in part, "When any of the six Functions described above become inoperable or when one or more Automatic Actuation Logic and Actuation Relays trains become inoperable, within one hour the Function must be restored or ..." Please confirm if this is still the case when RICT is applied?

j. On page 19 of Enclosure 1, Table E1-1, 3.3.5.A, SSC column, "Sustained undervoltage (SUR)…" This description seems inconsistent with previous descriptions and discussions; in Design Success Criteria column, "One of Two channels…", this seems inconsistent with previous two out of two logic description. Please clarify.

k. On page 41 of Enclosure 1, Table E1-3, note 4, second paragraph, "Failure to meet the Completion Time will cause entry into TS 3.8.1 for an inoperable Diesel Generator in accordance with TS 3.3.5, Condition G." Please confirm that entry into TS 3.8.1 could be extended up to 30 days with application of the RICT Program.

l. On page 49 of Enclosure 1, Table E1-4, Note 1, "The emergency Diesel Generators (DG) have two automatic starts outside of the starts provided in TS LCO 3.3.5, LOP DG Start Instrumentation; Blackout (undervoltage) and Safety Injection (SI). If the SI is the event initiator the SI starts the DG. If a loss of all offsite power (LOOP) is the event initiator the Blackout will start the DG. The starts provided in LCO 3.3.5 are anticipatory to a loss of offsite power. Separate relays provide the starts form LCO 3.3.5 Functions." Please confirm that the 3 initiators for DG to start are SI, LOOP, and station blackout (SBO), and that LOOP and SBO need LOP DG Start Instrumentation to start the DG.

m. On page 50 of Enclosure 1, Table E1-4, Note 2, "A loss of non-emergency offsite power will likely be accompanied by a loss of safety related offsite power. If that is so the Blackout (undervoltage) will start the DGs. If the Blackout start malfunctions, then any of the LCO 3.3.5 will start the DGs due to degraded voltage or undervoltage." Please clarify what non-emergency offsite power is.

QUESTION 26 – RICT Program (STSB)

The proposed administrative controls for the RICT Program in TS 5.5.23 paragraph "e" of Attachment 2 of the LAR were based on Section 2.2.2 of the model SE for TSTF-505 Revision 2. In its supplemental information request dated June 22, 2021 (ADAMS Accession No. ML21166A338), the NRC staff recommended that paragraph "e" be based on TSTF-505 Revision 2, which is inconsistent with the model SE for TSTF-505 Revision 2. In its response to the supplemental information request, the license changed paragraph "e" as requested. Upon further review, the NRC staff recognizes that the model SE for TSTF-505 Rev. 2 contains improved phrasing for the administrative controls for the RICT Program in TS 5.5.23 paragraph "e", namely the phrasing "this program" instead of "this amendment". In lieu of the phrase "this license amendment," discuss whether the phrases "Amendment # xxx" or, as discussed in the TSTF-505 model SE, "this program" would provide more clarity for this paragraph.

QUESTION 27 – Power Operated Relief Valve (PORV) Design Success Criteria (STSB)

Table E1-1 of Enclosure 1 of the LAR supplement includes descriptions of the design success criteria (DSC) for TS to be included in the RICT program. The DSC are the minimum set of remaining required equipment that can achieve the TS safety function while in the specified TS Condition. Please discuss/clarify the following multi-part DSCs and whether they represent a minimum set:

a. 3.4.11.B (One PORV inoperable and not capable of being manually cycled): One PORV OPERABLE, One PORV with two CCPs [centrifugal charging pumps], OR Two PORVs with one CCP AND one SI [safety injection] pump.

b. 3.4.11.C (One block valve inoperable): One PORV and associated block valve OPERABLE, One PORV and associated block valve with two CCPs, OR Two PORVs and associated block valves with one CCP AND one SI pump.

QUESTION 28 – Atmospheric Relief Valve (ARV) Design Success Criteria (STSB)

Table E1-1 of Enclosure 1 of the LAR supplement includes descriptions of the DSC for TS to be included in the RICT program. The DSC are the minimum set of remaining required equipment that can achieve the TS safety function while in the specified TS Condition. According to its DSC, TS 3.7.4.C includes a loss of function condition.

In the LAR Supplement Executive Summary, the response to NRC ARII 5 on “3.7.4.C Three or more required ARV lines inoperable,” states that “The RICT would only change the Completion Time based on risk analysis, not introduce a loss of safety function.” However, since a RICT is not allowed under a loss of safety function, please discuss why this loss of function variation, summarized in the TS description/DSC combination below, should be allowed in the RICT Program.

- TS 3.7.4.C (Three or more required ARV lines inoperable): One of four SG [steam generator] ARVs and CST [condensate storage tank] cooling water supply.