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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Ref 10 CFR 50.90

Subject: Comanche Peak Nuclear Power Plant (CPNPP)
Docket Nos. 50-445 and 50-446
Response to Request for Supplemental Information for License Amendment Request to Adopt 10 CFR 50.59, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors" (EPID L-2023-LLA-0057)

References:

1. Letter, J. Lloyd to NRC, "Application to Adopt 10 CFR 50.69, 'Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors.' LAR 23-001," April 19, 2023, ML23109A333

2. Letter, NRC to K. Peters, "SUPPLEMENTAL INFORMATION NEEDED FOR ACCEPTANCE OF REQUESTED LICENSING ACTION RE: LICENSE AMENDMENT REQUEST TO ADOPT 10 CFR 50.69, "RISK-INFORMED CATEGORIZATION AND TREATMENT OF STRUCTURES, SYSTEMS AND COMPONENTS FOR NUCLEAR POWER REACTORS" (EPID L-2023-LLA-0057), May 23, 2023, ML23132A254

Dear Sir or Madam:

By Reference 1, Vistra Operations Company LLC (Vistra OpCo) requested a license amendment request (LAR) to adopt 10 CFR 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors." In Reference 2, the NRC staff requested supplemental information to complete its acceptance review of the LAR. Vistra OpCo provides its response to this supplemental information in Enclosure 1 of this Letter.

This communication contains no new commitments regarding CPNPP Units 1 and 2.

Should you have any questions, please contact N. Boehmisch at (254) 897-5064 or nicholas.boehmisch@luminant.com.

I state under penalty of perjury that the foregoing is true and correct.

Executed on June 8, 2023.

Sincerely,

Jay Lloyd (Jun 8, 2023 12:24 CDT)

Jay J. Lloyd

Enclosure: Response to Supplemental Information Request

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SUPPLEMENTAL INFORMATION NEEDED
LICENSE AMENDMENT REQUEST TO ADOPT 10 CFR 50.69, "RISK-INFORMED CATEGORIZATION AND TREATMENT OF STRUCTURES, SYSTEMS AND COMPONENTS FOR NUCLEAR POWER REACTORS"
VISTRA OPERATIONS COMPANY LLC
COMANCHE PEAK NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-445 AND 50-446

By letter dated April 19, 2023, Vistra Operations Company LLC (Vistra OpCo, the licensee) submitted a license amendment request (LAR) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23109A333) for Comanche Peak Nuclear Power Plant, Unit Nos. 1 and 2 (Comanche Peak or CPNPP). The proposed LAR would allow, by the addition of license conditions, the implementation of the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors." The U.S. Nuclear Regulatory Commission (NRC) staff has identified that the following information is needed to begin its technical review:

Acceptance Review Information Insufficiencies – 1.

1. The LAR references the approval of the Comanche Peak adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF [Risk-Informed TSTF] Initiative 4b," dated August 22, 2022 (ML22192A007), as the basis for the probabilistic risk assessment (PRA) technical acceptability. Section 3.2 of the enclosure to the 50.69 LAR indicates that the PRA models credited in this request are the same PRA models credited in the TSTF-505 LAR dated May 11, 2021 (ML21131A233), for internal events, internal floods, and internal fire. The safety evaluation for the Comanche Peak TSTF-505 LAR has a number of items dispositioned specifically for the adoption of TSTF-505 at Comanche Peak, such as certain supporting requirements that are met at Capability Category-I, and a number of fire PRA related topics. Those items dispositioned specifically for the TSTF-505 LAR do not apply to the 50.69 LAR given the different risk parameters used. For example, for the TSTF-505 LAR, the change in core damage frequency and large early release frequency parameters are used, while importance measures, such as Fussell-Vesely and risk achievement worth, are used for the 50.69 LAR.

   The LAR also states that with regards to PRA assumptions and sources of uncertainty:

   > Key CPNPP PRA model specific assumptions and sources of uncertainty were identified and dispositioned for the RICT [risk-informed completion time] calculation as identified in Section 3.2.4.1.5 in Reference 1. The conclusion of this review was that no additional sensitivity analyses are required to address CPNPP PRA model specific assumptions or sources of uncertainty.

   However, the NRC staff noted that disposition of impact of PRA uncertainty to in the TSTF-505 LAR does not apply to the 50.69 LAR given the different risk metrics used.

Therefore, provide the following information to allow the NRC staff to review the PRA technical acceptability for the 50.69 LAR:

a) Discuss any updates for the PRA models since the submittal of the TSTF-505 LAR.

b) Discuss how the assessment of the PRA assumptions and sources of uncertainty for the 50.69 LAR was performed and provide the results of the assessment.

c) Provide an assessment of the impact of the two supporting requirements that were assessed as Capability Category-I in the TSTF-505 LAR on the 50.69 LAR.

d) Provide an assessment of the impact of any fire PRA related items that were dispositioned in the TSTF-505 LAR on the 50.69 LAR.

Response 1.a)

Since the time of the TSTF-505 application submittal, there have been no internal events, internal flooding or fire PRA model updates. Revision 5 of the internal events and internal flooding model and Revision 3 of the fire PRA remain as the models of record for CPNPP.

Response 1.b)

The purpose of this response is to assess the impact of Probabilistic Risk Assessment (PRA) modeling epistemic uncertainty for the 50.69 program.

The baseline internal events, internal flooding, and internal fire PRA models document assumptions and sources of uncertainty and these were reviewed during the respective hazard peer reviews. The approach taken is, therefore, to review these documents to identify the items which may be directly relevant to the 50.69 program calculations.

The list of assumptions and sources of uncertainty for all PRA models were reviewed to identify those which would be significant for this application. If the CPNPP PRA model used a non-conservative treatment, or methods that are not commonly accepted, the underlying assumption or source of uncertainty was reviewed to determine its impact on this application. To identify these assumptions and sources of uncertainty both plant-specific and generic sources of uncertainty were considered. All PRA notebooks were reviewed, and sources of uncertainty were compiled and characterized in the CPNPP Uncertainty Analysis Notebook. The identification and characterization of the sources of uncertainty was performed consistent with the requirements of the ASME/ANS PRA Standard (ASME/ANS RA-Sa-2009). This evaluation meets the intent of steps C-1 and E-1 of NUREG-1855, Revision 1. To assess the impact of sources of uncertainties on the 50.69 application, a review of the base case sources of uncertainty for the CPNPP PRA models was performed. Each identified uncertainty was evaluated with respect to its potential to significantly impact the decisions of this submittal. This evaluation meets the intent of the screening portion for steps C-2 and E-2 of NUREG-1855, Revision 1.

The characterization of assumptions and uncertainties for the baseline at-power PRA model are documented in R&R-PN-041 for internal events and internal flood, and CN-RAM-13-038 for internal fire. In general, the process used is as follows:

1. All plant-specific assumptions and uncertainties from the PRA notebooks are reviewed and dispositioned for potential impact on the baseline PRA model. At this stage, generic sources of uncertainty are included in the assessment.

2. Generic and plant-specific assumptions and sources of model uncertainty that have not been characterized in the individual PRA notebooks, are retained for further evaluation.

3. Any remaining assumptions and uncertainties (generic or plant-specific) are characterized, and applicable sensitivities are performed to assess impacts of those items on the baseline PRA model.

   The characterization of the assumptions and uncertainties of the baseline models is generally representative of the impacts that those assumptions and uncertainties will have on the 50.69 application. However, a complete review of these assumptions was performed to identify specific assumptions and sources of uncertainty that could have a unique impact for 50.69. Key CPNPP PRA model specific assumptions and sources of uncertainty for this application were identified and dispositioned in Table 1 for internal events (including internal flooding) and internal fire. The conclusion of this review is that no additional sensitivity analyses are required to address the CPNPP PRA model specific assumptions or sources of uncertainty for 50.69.

Table 1: Disposition of Key Sources of Assumptions and Uncertainties Related to 50.69					
ID	**Summary of Assumption/Uncertainty**	**Part of Model Affected**	**Generic Impact on Risk Applications**	**Evaluation of 50.69 Impact**	**Impacts 50.69 Assessment**
1	The baseline model is generally used for two types of quantifications: (1) to generate a T&M yearly average output and (2) to generate configuration-specific output. Because the model is static (i.e., boundary conditions cannot be changed dynamically), these two methods are essentially identical, but the interpretation is different. 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 is important because the results of this quantification should not be interpreted as having a particular train unavailable at any given time.	Unavailability modeling.	The treatment provides a realistic risk estimate for an average test and maintenance (T&M) quantification.	Average test & maintenance probabilities are used in the risk model. The risk model is appropriate and will not impact the risk insights for 50.69.	No.

Table 1: Disposition of Key Sources of Assumptions and Uncertainties Related to 50.69					
ID	**Summary of Assumption/Uncertainty**	**Part of Model Affected**	**Generic Impact on Risk Applications**	**Evaluation of 50.69 Impact**	**Impacts 50.69 Assessment**
2	The manual action included to start any pump that is standby conservatively assumes that if the operator fails to start one pump, he necessarily fails to start any of them (if more than one were needed to be started).	Station service water HFE modeling	The treatment is conservative.	The treatment is conservative and will not impact the risk insights for 50.69.	No.
3	The RC system is assumed to be operating, with PORVs and PSVs in standby. The PRA models the potential for either PORV train's block valve to be closed with alignment tags. The static (average) model uses these house events to represent the probability throughout the year of the block valves being closed.	Reactor Coolant system PORV block valve probability	The treatment is realistic for an average test and maintenance (T&M) quantification.	The PORV block valve probability is treated realistically in the configuration risk model.	No.
4	Various systems are structured such that T&M unavailability is applied only to the standby train. The basic event values for both trains are added together to account for the total unavailability. Applying this method ensures that T/M is applied appropriately regardless of which train is set to standby at the time of quantification.	Unavailability modeling	The treatment is conservative for an average test and maintenance (T&M) quantification, however, in this specific application, the treatment is realistic.	Average test & maintenance probabilities are used in the configuration risk model. The insights from the risk model are appropriate.	No.

Table 1: Disposition of Key Sources of Assumptions and Uncertainties Related to 50.69					
ID	**Summary of Assumption/Uncertainty**	**Part of Model Affected**	**Generic Impact on Risk Applications**	**Evaluation of 50.69 Impact**	**Impacts 50.69 Assessment**
5	Various systems include logic to include certain aspects of modeling at various times of the year. The XHOSCWSUMMER event is used in the model for summer operation. When this event is set to TRUE, additional cooling from the vent-chilled water system is required.	System modeling– seasonal variation	Seasonal variation needs to be included, as appropriate in the configuration-specific applications. If seasonal variation isn't accounted for, the PRA results could be optimistic.	House events are included in the model to specify seasonal conditions (e.g., XHOSCWSUMMER). The alignment tags are used to account for the seasonal conditions. For Baseline PRA runs, they are set conservatively and are therefore treated realistically and will not significantly impact the insights for 50.69 application.	No.

Table 1: Disposition of Key Sources of Assumptions and Uncertainties Related to 50.69					
ID	**Summary of Assumption/Uncertainty**	**Part of Model Affected**	**Generic Impact on Risk Applications**	**Evaluation of 50.69 Impact**	**Impacts 50.69 Assessment**
6	Loss of HVAC can result in room temperatures exceeding equipment qualification limits. Treatment of HVAC requirements varies across the industry and often varies within a PRA. There are two aspects to this issue. One involves whether the SSCs affected by loss of HVAC are assumed to fail (i.e., there is uncertainty in the fragility of the components). The other involves how the rate of room heat-up is calculated and the assumed timing of the failure.	Dependency on HVAC for system modeling and timing of accident progressions and associated success criteria	Assume loss of design basis HVAC leads to a loss of SSC function at t=0. Analysis developed to show that inadequate HVAC (based on realistic assessment) does not necessarily lead to loss of SSC function within the mission time for system operation.	In this specific application, the treatment is realistic and the insights from the risk model are appropriate.	No.

Table 1: Disposition of Key Sources of Assumptions and Uncertainties Related to 50.69					
ID	**Summary of Assumption/Uncertainty**	**Part of Model Affected**	**Generic Impact on Risk Applications**	**Evaluation of 50.69 Impact**	**Impacts 50.69 Assessment**
7	There are several sources of uncertainty associated with the Human Reliability Analysis (HRA). Technical issues associated with any HRA include: • Whether the modeling of the human failure events are sufficiently complete and appropriate for the fire scenarios modeled in the fire PRA; • Whether the screening rules and associated screening HEPs are reasonable and will not allow inadvertent screening out of potentially important HFEs and associated scenarios; • Whether the detailed HRAs and subsequent HEPs have properly considered the important performance-shaping factors, especially considering the unique characteristics of fire-type scenarios, and used tools to adequately consider these factors.	Human Reliability Analysis	Due to the uncertainty the fire has on the operators and to account for fire-related distractions, the internal event timings for T_{cog} and T_{exe} increased by a specified duration. This additional time delay is meant to be a conservative estimate to account for the path to the execution location and accuracy in operator timing estimates. The dependency analysis accounted for HFE's that use the same cues. These events were given complete dependency. The HFE probability is elevated where the instrumentation or its associated power supply impacts the cue.	If instruments are failed by the fire, the operator response is not credited. Failures of systems may also be included if spurious indications could lead to failure of the system to meet its PRA credited function. Note that virtually every fire HFE is developed on a detailed basis, beyond just a screening HEP level. Most uncertainty is addressed by using a conservative bias (i.e., using the CBDTM/HCR method in the HRA calculator to estimate the HEP) and by evaluating the error factor associated the HFE using UNCERT.	No.

Response 1.c)

Per NEI 00-04, “10 CFR 50.69 SSC Categorization Guideline”, Capability Category II of the standards is applicable and lower than ASME Capability Category II in the Reg Guide 1.200 process that deviations from these CCs relative to the SSC Categorization (50.69) program be justified and documented, as necessary.

The following are the two remaining Category I SR and the CPNPP responses.

SR	**Assessment**
IFEV-A6	R&R-PN-021 Section 4.7 indicates that the flood initiating event frequencies were based on the EPRI 1021086 failure data combined with plant-specific piping lengths. No Bayesian updating with plant-specific operating experience or adjustment based on engineering judgement was performed. Assessment: Cat I is MET **Response** During the internal flooding (IF) analysis a search for previous IF events at CPNPP was performed and none were found. A Bayesian update with no specific plant events would incur a non-conservative result; therefore, no Bayesian update was performed as there is no impact to application evaluations. Assessment: Status remains at Cat I
SR	**Assessment**
LE-C11	No credit was taken for continued operation of equipment after containment failure. RXE-LA-CPX/0-105 Table 6-1 specifically notes that “No credit is taken for operation of the ECCS/CS system after containment failure or for operator actions or other equipment that could be impacted by containment failure because there are none that are significant.” It is not clear that this is equivalent to justifying “any credit given” as required for CC II/III. Assessment: Cat I is MET **Response** Since no credit has been taken for continued operation after containment failure, justification cannot be provided. Impact on specific applications will be evaluated as needed. Assessment: Status remains at Cat I

As identified above, the Internal Flooding SR would not be a limitation for the PRA model use in support of a 50.69 assessment. With regards to the LE SR, not crediting operator action post containment failure would have minimal, if any, impact on the 50.69 application as core damage had occurred and containment had failed for these sequences. The equipment that would be covered under this program would be evaluated based on preventing core damage and containment integrity.

These assessments are not considered limiting since use of model results would be conservative or non-impactive for the 50.69 application.

Response 1.d)

The TSTF-505 Comanche Peak LAR dated May 11, 2021 (ML21131A233), and all its subsequent associated supplements, and the TSTF-505 Comanche Peak Safety Evaluation (ML22192A007) were reviewed, and no items were dispositioned based solely on their use in the TSTF-505 application. Therefore, the PRA models used to support the TSTF-505 application can be used to support the 10 CFR 50.69 application.

Acceptance Review Information Insufficiencies – 2.

2. LIC-109, Revision 3, "Acceptance Review Procedures" (ML20036C829), states that (1) lacking an analysis necessary for the NRC staff's review should be considered unacceptable, (2) simply referencing unapproved guidance may not be acceptable, and (3) deviations from guidance should not be considered acceptable unless fully justified. The LAR states "To address seismic hazard in the Structures, Systems and Components (SSC) categorization process, an alternative method to NEI [Nuclear Energy Institute] 00-04 ["10 CFR 50.69 SSC Categorization Guideline" (ML052900163)], has been implemented consistent with the Electric Power Research Institute (EPRI) Alternative Seismic Approach described in EPRI Report 3002022453 ["Alternate Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization"]." Further, section 3.1.1 of the enclosure to the LAR states "…evaluation of impact of the seismic hazard, which will use the EPRI Alternative Tier 1 Seismic Approach described in EPRI Report 3002022453…." The NRC staff has not reviewed EPRI Report 3002022453. The report has not been submitted by the licensee as part of the LAR and it is currently unavailable in ADAMS. Further, EPRI Report 3002022453 includes changes beyond technical updates compared to prior EPRI reports reviewed by the NRC staff. Review of these changes can increase the NRC staff's resources and schedule for this LAR. The NRC staff has communicated issues resulting from the use of EPRI Report 3002022453 to licensees and EPRI.

   EPRI Report 3002017583, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization," is available in ADAMS (ML21082A170) and has been used by several licensees to support their approved Tier 1 alternative seismic approach. EPRI Report 3002017583 includes the updates to the Tier 1 approach resulting from the NRC staff's review of the Calvert Cliffs Nuclear Power Plant, Units 1 and 2, 10 CFR 50.69 amendment (ML19330D909).

   Provide EPRI Report 3002022453 for the NRC staff's review as a supplement to the LAR. Alternately, the licensee can choose to support its proposed alternative seismic approach by using and citing an approach previously accepted by the NRC, such as EPRI Report 3002017583.

Response 2.

Vistra OpCo proposes to use EPRI Report 3002017583, "Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization," which is available in ADAMS (ML21082A170) and has been used by several licensees to support their approved Tier 1

alternative seismic approach. EPRI Report 3002017583 includes the updates to the Tier 1 approach resulting from the NRC staff's review of the Calvert Cliffs Nuclear Power Plant, Units 1 and 2, 10 CFR 50.69 amendment (ML19330D909).

Any mention of EPRI Report 3002022453 described in Vistra OpCo's submittal letter dated April 19, 2023 (ML23109A333) now refers to EPRI Report 3002017583

Acceptance Review Information Insufficiencies – 3.

3. LIC-109, Revision 3, states that the staff should determine if there are significant, obvious problems with the information and analyses provided. Section 3.2.4 of the enclosure to the LAR references the screening performed in the licensee's TSTF-505 LAR. However, information specific to the 50.69 LAR on categorization of SSCs considering other external hazards is not included in the LAR. Specifically, there is no discussion on whether any SSCs are credited in the screening of other external hazards and if yes, how those SSCs will be categorized, including justification for any deviations from the guidance in NEI 00-04 for the categorization of these SSCs.

   Describe how SSCs that are credited for screening of other external hazards will be categorized consistent with the guidance in NEI 00-04. Identify and justify any deviations from relevant guidance in NEI 00-04 for the categorization of such SSCs.

Response 3.

The following supersedes the text in the All Other External Hazards subsection in Section 3.2.4 of Vistra OpCo's submittal letter dated April 19, 2023 (ML23109A333):

Other external hazards were evaluated for Comanche Peak in the TSTF-505, Revision 2 and were screened as identified in the approval of Comanche Peak adoption of TSTF-505, Revision 2, Section 3.2.4.1.3, subsection Evaluation of Other External Hazards (ML22192A007). This screening was performed in a plant-specific evaluation in accordance with Generic Letter 88-20, Supplement 4, and using the criteria in ASME PRA Standard RA-Sa-2009, NUREG/CR-2300, and NUREG-1407. This screening evaluation was examined for 10 CFR 50.69 applicability which identified no SSCs that are credited in the screening of other external hazards and that the screening evaluation of hazards are acceptable for 10 CFR 50.69 (excluding internal flooding, internal fire, seismic, and extreme winds and tornados which are addressed in other sections of Vistra OpCo's submittal letter dated April 19, 2023). Table 2 provides a summary of the external hazards screening results. Table 3 provides a summary of the progressive screening approach for external hazard with modifications compared to the Second Supplement for Comanche Peak's TSTF-505, Revision 2 LAR (ML22048B490) to address 10 CFR 50.69 applicability. These modifications were for Extreme (High) Winds and Tornados, Hail, Hurricane, Internal Flooding, and Seismic Activity, along with editorial changes.

Consistent with NEI 00-04, as part of the categorization assessment of other external hazard risk, an evaluation will be performed to determine if there are components being categorized that participate in screened scenarios and whose failure would result in an unscreened scenario. Consistent with the flow chart in Figure 5-6 in Section 5.4 of NEI 00-04, these components would be considered HSS.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
Biological	Biological Events	Y	C5	Sudden influxes are not applicable to the plant design: (1) closed loop systems for Component Cooling Water System (CC) and (2) chemical control of Asiatic clams and debris removal provided by Station Service Water (SW) subsystems. SW system design addressed GL 89-13 for periodic flushing/heat exchanger monitoring and IN 88-37 for prevention of flow blockage. Slowly developing growth can be detected and mitigated by surveillance. There is sufficient time to respond to these hazards before system operation would be jeopardized.
External Fire	Forest Fire	Y	C3	Not applicable to the site because of limited vegetation, as confirmed in walkdown and discussion with plant staff. Land surrounding the CPNPP site is kept cleared such that a forest fire cannot propagate to the site.
	Grass Fire	Y	C3	Not applicable to the site cause of limited vegetation, as confirmed in walkdown and discussion with plant staff. Land surrounding the CPNPP site is kept cleared such that grass fire cannot propagate to the site.
Meteor / Satellite Strike	Meteor / Satellite Strike	Y	C2	The event has a low initiating event frequency. Per R&R-PN-205 the probability of a meteorite or satellite strike is less than 1E-09.
Extreme Temperature	Frost	Y	C1	Frost has lesser damage potential than snow and ice. CPNPP is designed for freezing temperature, which are infrequent and short in duration. Principal effects of this hazard would be to cause a loss of off-site power which is addressed in the weather-related Loss of Offsite Power initiating event in the internal events PRA model.
	Frazil Ice (Ice Cover)	Y	C3	Ice blockage causing flooding is not applicable to the site because of location (no nearby rivers and climate conditions, i.e. low air temperatures about -6°C or lower). CPNPP is designed for freezing temperatures, which are infrequent and short in duration. Historical floods are limited to precipitation runoff into streams and rivers; thus the area is not subject to floods from ice jams.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
	High Summer Temperature	Y	C1	CPNPP is designed for this hazard. Associated plant trips have not occurred and are not expected. The principal effect of elevated temperature would be reduced level in the Safe Shutdown Impoundment (SSI) that serves as the plant's ultimate heat sink. The TS LCO 3.7.9 imposes a limit of 102°F for the SW intake temperature and a minimum of 770 feet for the SSI level during normal operation. These effects would take place slowly allowing time to initiate orderly plant reductions, including shutdowns. Temperature data presented in the FSAR are consistent with the performance of the ultimate heat sink within the established design basis. The historical extreme maximum temperature is reported as 108°F.
	Low Winter Temperature	Y	C1	Low winter temperature can be screened out since the hazard presents the same or lesser damage potential than the hazards for which the plant has been designed. On occasion, arctic air masses push through the region and cause some of the coldest temperatures. Cold spells, however, rarely last more than a few days. Temperature data presented in the FSAR indicate the historical extreme minimum temperature of 10°F.
Ground Shifts	Avalanche	Y	C3	Topography of CPNPP precludes the possibility of a snow avalanche.
	Coastal Erosion	Y	C3	The inland location of CPNPP precludes the possibility of coastal erosion.
	Landslides	Y	C3	Land sliding and/or reservoir slope failures are not an expected source of flood waves. Natural slopes are 3:1 (Horizontal to Vertical), or flatter, except for occasional local portions of slope which are steeper (ranging to 2:1 or 1:1). Slope failures are improbable, but small localized sloughs conceivably might occur from erosion and/or weathering of the exposed edges of claystone seams from beneath overlying, more resistant rock zones. The small waves resulting from such failures will not adversely affect CPNPP facilities.
	Sinkholes	Y	C3	The reservoir is formed in the Glen Rose formation, a predominately limestone sequence. Information developed regarding this formation indicated it is relatively impermeable and free of sinkholes and solutioning. Thus, significant loss of water is improbable.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
	Soil Shrink-Swell	Y	C1	Based on geology and seismology information the impact from shrink or swell is expected to be negligible. Regarding the stability of subsurface materials, there is no evidence in the site region indicating actual or potential uplift or subsidence, cavernous or karst terrain, tectonic warping or deformational zones pertinent to the site. Zones of alteration, weathering, structural weaknesses, unrelieved residual stresses or geological hazardous materials are not in evidence.
Heat Sink Effects	Drought	Y	C5	Drought effects would take place slowly allowing time for orderly plant reductions, including shutdowns. Drought conditions (extended periods of widespread meager precipitation) are known to occur in Texas. The most severe this century in Texas occurred during 1954-1956. Low flow in Squaw Creek or in the Brazos River is not of concern to plant safety because station cooling water is obtained from SCR. Low flow considerations are significant in terms of successful over-all plant operations and agreements are in place to provide supplemental water from Lake Granbury on the Brazos River.
	Low Lake or River Water Level	Y	C1	This hazard has been considered in the design of the UHS. The TS LCO 3.7.9 imposes a minimum of 770 feet for the SSI level during normal operation. These effects would take place slowly allowing time to initiate orderly plant reductions, including shutdowns.
	River Diversion	Y	C1	Lake Granbury, which is on the Brazos River, will be a major source of makeup cooling water. The loss of Lake Granbury makeup water due to the diversion of the Brazos River is highly improbable. Above Lake Granbury, the Brazos River channel is cut into bedrock which precludes any reasonable possibility of the river changing its channel significantly within the life of the CPNPP and thus affecting the supply of water.
High Wind	Extreme (High) Winds and Tornados	N	N/A	Refer to the Extreme Winds and Tornadoes subsection in Section 3.2.4 in the Vistra OpCo's submittal letter dated, April 19, 2023 (ML23109A333).

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
	Hail	Y	C1, C4	History of large hail near the Comanche Peak site indicates potentially damaging hailstorms are infrequent. The principal effects of a hail event would be a potential challenge to offsite power and exposed equipment, and equipment within non-safety buildings. The weather-related loss of offsite power is addressed in the internal events PRA. Hail impact on SSCs is bounded by the effects of tornado missiles.
	Hurricane	Y	C4	The inland location reduces the effects of hurricanes for CPNPP. In addition, this hazard is bounded by the effects of extreme winds and tornados.
	Sandstorm	Y	C3	Sandstorms are not applicable at the CPNPP site where the surrounding areas is described as open terrain with gently rolling hills. Additionally, a review of Fort Worth experience observed dust storms with visibilities of one mile or less were infrequent.
Industrial Accidents	Military Facility Accidents	Y	C3	Within the 10-mile area, there are no military bases, missile sites, military firing ranges or munitions facilities. The nearest military bases are Carswell Air Force Base, approximately 38 miles north-northeast, and Fort Hood, approximately 65 miles south. There are no missile sites within 50 miles.
	Industrial Facility Accidents	Y	C3	Neither an accidental explosion, nor a toxic chemical release from a nearby industrial facility will pose a hazard to the plant. Within the 10-mile areas, there are no chemical plants and storage facilities, tank farms or upstream sources of corrosive or oil discharges. There are no industrial facilities within 5 miles of the site, and those at greater distances are not significant to CPNPP from a safety standpoint.
	Mining Accident	Y	C3	There are no mining operations in the vicinity of CPNPP. The Engineering Geological Evaluation noted that except for the removal of minor quantities of sand, gravel and dimension stone in the site vicinity, no mining has occurred.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
	Pipeline Accident	Y	C1, PS2	Hazardous materials regularly manufactured, stored, used, or transported in the site vicinity are limited to crude oil and natural gas transported through the pipelines (one transporting crude oil and the other three transporting gas). There is no significant hazard from toxic releases or explosions involving these pipelines that could interact with the plant. Explosive hazard impacts and control room habitability impacts meet the 1975 SRP requirements (RGs 1.91 and 1.78). Additional detailed qualitative analysis in regard to the screening of the industrial accident hazard is provided in R&R-PN-205.
	Release of Chemicals from On-Site Storage	Y	C1	Water systems (CW and SW) are chemically treated for control of biological growth with solutions of sodium hypochlorite and sodium bromide. The diluted sodium hypochlorite and sodium bromide solutions which in diluted form will not present a threat to control room habitability. Liquified chlorine stored within the site boundary will not exceed 150 lbs. capacity and only small quantities of 20 lbs. or less will be stored within the protected areas. Various acids and caustics are stored on-site but pose no hazard to the plant. Chemical Hazards stored and transported in the vicinity of the plant are analyzed in accordance with CPNPP Technical Specifications 5.5.20.
	Toxic Gas	Y	C4	Toxic gas is included under Release of Chemicals in Onsite Storage, Industrial or Military Facility Accident, and Transportation Accidents.
Internal Flooding	Internal Flooding	N	N/A	A detailed Internal Flood PRA is performed for CPNPP. Refer to the Section 3.2.1 in the Vistra OpCo's submittal letter dated, April 19, 2023 (ML23109A333).

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
Lightning Strikes	Lightning Strikes	Y	C1, C4	Lightning strikes are not uncommon in nuclear power plant experience; they have the potential to result in a loss of offsite power or surges in instrument output if grounding is not fully effective. The plant design basis includes a Lightning Protection System to minimize damage to structures or equipment by providing a suitable path for the stroke current. CPNPP has incorporated industry and plant specific data for LOOP and plant trip due to a transient, however other causes are also included such that the impacts from lightning are no greater than already modeled in the internal events PRA. This conclusion is also confirmed with a bounding analysis in R&R-PN-205.
External Flooding	High Tide	Y	C3	The inland location of CPNPP precludes the possibility of a high tide condition. High water level effects from this hazard do not apply for CPNPP based on the small size of Squaw Creek Reservoir and the shutdown impoundment. The site grade is at elevation 810 feet, which provides 20.3 feet of freeboard above the Probable Maximum Flood (PMF) and superimposed wave runup on Squaw Creek Reservoir. The site grade is well above the maximum water levels conceivable on the Brazos River. Hence, the site will be unaffected by river flooding of any kind and will not be affected by tsunami, seiche, or ice flooding.
	Precipitation, Intense	Y	C1, PS2	Effects of local intense precipitation (LIP) are incorporated into the Probable Maximum Flood (PMF) for the site, which is used in bounding external flooding calculations. Re-evaluation resulted in a minor increase in maximum flood elevation due to LIP. Subsequent engineering evaluation determined resulting flood heights within safety-related structures did not affect mitigating strategy equipment and were bounded by internal flood results. Additional detailed qualitative analysis in regard to the screening of the external flooding hazard is provided in R&R-PN-205.
	Tsunami	Y	C3	Plant location precludes the possibility of a tsunami. This site is nearly 300 miles from the Gulf of Mexico and the plant will be over 800 feet above sea level. Therefore, tsunami flooding will not occur.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
	Storm Surge	Y	C3	There are no existing large bodies of water near the site that would allow development of either surge or seiche; therefore, there is no history of surge and seiches in the site vicinity. The small size, relatively shallow depth and irregular shape of Squaw Creek Reservoir indicates that there is a minimum probability of either surges or seiches occurring in the reservoir. Therefore, surge and seiche should not be considered significant at this site. Re-evaluation addressed storm surge due to the probable maximum hurricane and because CPNPP Units 1&2 are located greater than 250 miles inland from the Gulf of Mexico, and at a site grade of 810 ft, hurricanes are not expected to be a potential flooding hazard.
	Seiche	Y	C3	There are no existing large bodies of water near the site that would allow development of either surge or seiche; therefore, there is no history of surge and seiches in the site vicinity. The small size, relatively shallow depth and irregular shape of Squaw Creek Reservoir indicates that there is a minimum probability of either surges or seiches occurring in the reservoir. Therefore, surge and seiche should not be considered significant at this site. Re-evaluation determined seismic induced seiche is bounded by the site PMF and potential for landslide induced seiche is not plausible based on a slope stability analysis of the Squaw Creek Reservoir.
	Waves	Y	C1, C4	Effects of wind-generated waves and flood waves are incorporated into the Probable Maximum Flood (PMF) for the site, which is used in bounding external flooding calculations. Evaluation of external flood mechanisms, including combined effects, concluded waves will not challenge safety-related structures.
Seismic Activity	Seismic Activity	N	N/A	CPNPP is an EPRI Tier 1 Plant as defined by EPRI 3002017583. Refer to the Section 3.2.3 in the Vistra OpCo's submittal letter dated, April 19, 2023 (ML23109A333), and the response in this enclsoure to Acceptance Review Information Insufficiencies 2.
Snow and Ice	Snow and Ice	Y	C1, C4	CPNPP is not subject to ice flooding or ice jams. Snowmelt was not considered in establishing the PMF.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
Transportation Accidents	Air: Aircraft Impact	Y	PS2, PS4	There are no airports within five miles of the Station. Furthermore, there are no airports with greater than 500 d2 ("d" is the distance in miles from the Station) movements per year within 10 miles, nor are there any airports with projected operations in excess of 1000 d2 movements per year within 50 miles. Data from the National Transportation Safety Board is used with a statistical model (causation probability, or the probability of an aircraft totally losing control) and the geometrical probability of random collision. This method applied with conservative inputs includes review of the four air routes within 10 square miles of the site and the inflight crash rater per mile for aircraft using the airway; it results in the probability of an aircraft crashing into the CPNPP site as 1.91E-07 per year. For a CCDP assumed as 1.0, the hazards due to aircraft crashes is thus screened based on CDF <1.0E-06. Additional detailed qualitative analysis in regard to the screening of the transportation accident hazard is provided in R&R-PN-205.
	Land: Vehicle Impact or Explosion Railroad Explosion	Y	C3	Site area access is by a plant railroad, which connects to the Atchison, Topeka, and Santa Fe Railroad Company main line at Tolar, Texas (distance to junction is approximately 11 miles), by a plant access road which connects to FM 56 (approximately 8900 feet southwest of the center line between the Containment buildings) and by County road 213 (also known as Coates Rd) which connects to State Highway 144. Access by rail or road is controlled by CPNPP. Due to the long distance from the closest road (rural or highway) to the plant, any accidental explosion will not endanger the safe operation of the plant. Physical damage to the plant caused by a truck colliding with plant structures is considered minimal due to the distance between main roads and highways and the plant structures.

Table 2: External Hazards Screening				
Group	**Hazard**	**Screened (Y/N)**	**Criterion (Note a)**	**Discussion**
	Water: Collisions with Intake Structures Explosion	Y	C3	The Service Water Intake Structure is located on the Safe Shutdown Impoundment which is not open to public transportation. Therefore, a significant collision with this structure is not considered a credible event.
	Fog	Y	C4	Fog occurs relatively infrequently in the region and around the site. The occurrence of heavy fog would not impact plant operations or the ability to achieve safe shutdown if necessary, however, fog affects the frequency of occurrence of the air, land, and water transportation hazards, and is indirectly considered in those hazards.
Turbine-Generated Missiles	Turbine-Generated Missiles	Y	C1	The overall probability of generating external turbine missiles which could pose a threat to safety related SSCs, P4, is less than the overall NRC of 1E-7 per year, thereby ensuring an acceptable risk rate for the loss of an essential system from a single event.
Volcanic Activity	Volcanic Activity	Y	C3	Not applicable to the site because of location. The geologic history shows no evidence for volcanic activity in the area.
Note a – See Table 3 for descriptions of the screening criteria.				

Table 3: Progressive Screening Approach for Addressing External Hazards

Event Analysis	Criterion	Source	Comments
Initial Preliminary Screening	C1. Event damage potential is < events for which plant is designed.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	-
	C2. Event has lower mean frequency and no worse consequences than other events analyzed.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	-
	C3. Event cannot occur close enough to the plant to affect it.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	-
	C4. Event is included in the definition of another event.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	Not used to screen. Used only to include within another event.
	C5. Event develops slowly, allowing adequate time to eliminate or mitigate the threat.	ASME/ANS Standard RA-Sa-2009	-
Progressive Screening	PS1. Design basis hazard cannot cause a core damage accident.	ASME/ANS Standard RA-Sa-2009	-
	PS2. Design basis for the event meets the criteria in the NRC 1975 Standard Review Plan (SRP).	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	-
	PS3. Design basis event mean frequency is < 1E-5/y and the mean conditional core damage probability is < 0.1.	NUREG-1407 as modified in ASME/ANS Standard RA-Sa-2009	-

Table 3: Progressive Screening Approach for Addressing External Hazards			
Event Analysis	**Criterion**	**Source**	**Comments**
	PS4. Bounding mean CDF is < 1E-6/y.	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	-
Detailed PRA	Screening not successful. PRA needs to meet requirements in the ASME/ANS PRA Standard.	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	-

Acceptance Review Information Insufficiencies – 4.

4. Section 2.3 of the enclosure to the LAR proposes a condition on the licensee's operating license, which states, in part, "…Vistra OpCo is approved to implement 10 CFR 50.69 using the EPRI alternative Tier 1 seismic approach for active categorization of RISC [Risk-Informed Safety Class]-1, RISC-2, RISC-3, and RISC-4 SSCs, and as specified in License Amendment No. [XXX] dated [DATE]." The NRC staff has not reviewed and approved the EPRI report(s) documenting the so-called Tier 1 process as generic topical reports. Therefore, the proposed license condition needs to reflect the fact that the alternative seismic approach is proposed by the licensee. Several precedents are available where the NRC staff has approved proposed license conditions stating simply "…the proposed alternative seismic approach…"

   Justify the use of "the EPRI alternative Tier 1 seismic approach" in the proposed license condition when the licensee is requesting the methodology on a plant-specific basis and the NRC staff has not approved the approach or the EPRI report(s) as a generic methodology. Alternately, the licensee can choose to propose a condition which identifies the alternative seismic approach as the licensee's proposed approach

Response 4.

Provided below is superseded wording of the proposed license condition compared to the Vistra OpCo's submittal letter dated, April 19, 2023 (ML23109A333) to address the seismic evaluation. Additional clarification on the passive categorization portion of the license condition for evaluation of non-class SSCs and other external hazards were also added. This license condition is similar to the license condition in "Arkansas Nuclear One, Unit 1 - Issuance of Amendment No. 277 RE: Adoption of 10 CFR 50.69, "Risk- informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors" (EPID L-2021-LLA-0105)", June 23, 2022, ML22138A431, with the added addition of non-class SSC assessments for passive categorization:

Vistra OpCo is approved to implement 10 CFR 50.69 using the processes for categorization of Risk-Informed Safety Class (RISC)-1, RISC-2, RISC-3, and RISC-4 structures, systems, and components (SSCs) using: Probabilistic Risk Assessment (PRA) models to evaluate risk associated with internal events, including internal flooding, and internal fire; the shutdown safety assessment process to assess shutdown risk; the Arkansas Nuclear One, Unit 2 (ANO-2) passive categorization method to assess passive component risk for Class 2 and Class 3 and non-class SSCs and their associated supports; the results of the non-PRA evaluations that are based on the IPEEE Screening Assessment for External Hazards updated using the external hazard screening significance process identified in ASME/ANS PRA Standard RA-Sa-2009 for other external hazards except wind-generated missiles and seismic; the tornado safe shutdown equipment list for wind-generated missiles; and the alternative seismic approach as described in Vistra OpCo's submittal letter dated April 19, 2023, and all its subsequent associated supplements, as specified in License Amendment No. [XXX] dated [DATE].

Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from a seismic margins approach to a seismic probabilistic risk assessment approach).