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

May 9, 2017

Mr. Ken J. Peters
Senior Vice President and Chief
Nuclear Officer
Attention: Regulatory Affairs
TEX Operations Company, LLC
P.O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2 – FLOOD HAZARD MITIGATION STRATEGIES ASSESSMENT (CAC NOS. MF7913 AND MF7914)

Dear Mr. Peters:

By letter dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340), the U.S. Nuclear Regulatory Commission (NRC) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), "Conditions of Licenses" (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force (NTTF) report (ADAMS Accession No. ML111861807).

Enclosure 2 to the 50.54(f) letter requested that licensees reevaluate flood hazards for their sites using present-day methods and regulatory guidance used by the NRC staff when reviewing applications for early site permits and combined licenses (ADAMS Accession No. ML12056A046). Concurrent with the reevaluation of flood hazards, licensees were required to develop and implement mitigating strategies in accordance with NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ADAMS Accession No. ML12054A735). In order to proceed with implementation of Order EA-12-049, licensees used the current licensing basis flood hazard or the most recent flood hazard information, which may not be based on present-day methodologies and guidance, in the development of their mitigating strategies.

By letter dated February 9, 2017 (ADAMS Accession No. ML17044A009), Luminant Generation Company, LLC (now TEX Operations Company LLC, the licensee) submitted the mitigation strategies assessment (MSA) for Comanche Peak Nuclear Power Plant, Units 1 and 2 (Comanche Peak). The MSAs are intended to confirm that licensees have adequately addressed the reevaluated flooding hazards within their mitigating strategies for beyond-design-basis external events. The purpose of this letter is to provide the NRC's assessment of the Comanche Peak MSA.

The NRC staff has concluded that the Comanche Peak MSA was performed consistent with the guidance described in Appendix G of Nuclear Energy Institute 12-06, Revision 2, as endorsed by Japan Lessons-Learned Division (JLD) interim staff guidance (ISG) JLD-ISG-2012-01, Revision 1, and that the licensee has demonstrated that the mitigation strategies, if appropriately implemented, are reasonably protected from reevaluated flood hazards conditions for beyond-design-basis external events. This closes out the NRC's efforts associated with CAC Nos. MF7913 and MF7914.

If you have any questions, please contact me at 301-415-1132 or at Joseph.Sebrosky@nrc.gov.

Sincerely,

Joseph M. Sebrosky, Senior Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Enclosure:
Staff Assessment Related to the
Mitigating Strategies for Comanche Peak

Docket Nos. 50-445 and 50-446

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STAFF ASSESSMENT BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO MITIGATION STRATEGIES FOR COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2, AS A RESULT OF THE REEVALUATED FLOODING HAZARD NEAR-TERM TASK FORCE RECOMMENDATION 2.1

CAC NOS. MF7913 AND MF7914

1.0 INTRODUCTION

By letter dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340), the U.S. Nuclear Regulatory Commission (NRC) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), "Conditions of Licenses" (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force (NTTF) report (ADAMS Accession No. ML111861807).

Enclosure 2 to the 50.54(f) letter requested that licensees reevaluate flood hazards for their sites using present-day methods and regulatory guidance used by the NRC staff when reviewing applications for early site permits and combined licenses (ADAMS Accession No. ML12056A046). Concurrent with the reevaluation of flood hazards, licensees were required to develop and implement mitigating strategies in accordance with NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ADAMS Accession No. ML12054A735). That order requires holders of operating reactor licenses and construction permits issued under 10 CFR Part 50 to modify the plants to provide additional capabilities and defense-in-depth for responding to beyond-design-basis external events, and to submit to the NRC for review a final integrated plan (FIP) that describes how compliance with the requirements of Attachment 2 of the order was achieved. To proceed with implementation of Order EA-12-049, licensees used the current licensing basis flood hazard or the most recent flood hazard information, which may not be based on present-day methodologies and guidance, in the development of their mitigating strategies.

The NRC staff and industry recognized the difficulty in developing and implementing mitigating strategies before completing the reevaluation of flood hazards. The NRC staff described this issue and provided recommendations to the Commission on integrating these related activities in COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flood Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256). The Commission issued a staff requirements memorandum on March 30, 2015 (ADAMS Accession No. ML15089A236), affirming that the Commission expects licensees for operating nuclear power plants to address the reevaluated flood hazards, which are considered beyond-design-basis external events, within their mitigating strategies.

Nuclear Energy Institute (NEI) 12-06, Revision 2, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" (ADAMS Accession No. ML16005A625), has been endorsed by the NRC as an appropriate methodology for licensees to perform assessments of the mitigating strategies against the reevaluated flood hazards developed in response to the March 12, 2012, 50.54(f) letter. The guidance in NEI 12-06, Revision 2, and Appendix G in particular, supports the proposed Mitigation of Beyond-Design-Basis Events rulemaking. The NRC's endorsement of NEI 12-06, including exceptions, clarifications, and additions, is described in NRC Japan Lessons-Learned Division (JLD) interim staff guidance (ISG) JLD-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15357A163). Therefore, Appendix G of NEI 12-06, Revision 2, describes acceptable methods for demonstrating that the reevaluated flooding hazard at the Comanche Peak Nuclear Power Plant, Units 1 and 2 (Comanche Peak) site is addressed against mitigating strategies for beyond-design-basis external events.

2.0 BACKGROUND

By letter dated February 11, 2016 (ADAMS Accession No. ML16041A228), the NRC issued a mitigation strategies flood hazard information (MSFHI) letter for Comanche Peak. The MSFHI letter provided the reevaluated flood hazard mechanisms that exceeded the current design basis (CDB) for Comanche Peak and parameters that are a suitable input for the mitigating strategies assessment (MSA). For Comanche Peak, the mechanisms listed as not bounded by the CDB in the MSFHI letter are local intense precipitation (LIP) and the streams and rivers probable maximum flood (PMF). By letter dated February 9, 2017 (ADAMS Accession No. ML17044A009), Luminant Generation Company, LLC (now TEX Operations Company LLC, the licensee) submitted the Comanche Peak MSA for review by the NRC staff. The letter also included the relevant associated effects (AE) and flood event duration (FED) parameters used by the licensee in the MSA.

3.0 TECHNICAL EVALUATION

3.1 Mitigating Strategies under Order EA-12-049

By letter dated February 28, 2013 (ADAMS Accession No. ML13071A617), the licensee submitted its overall integrated plan for Comanche Peak in response to Order EA-12-049. By letters dated December 19, 2013 (ADAMS Accession No. ML13234A503), and August 5, 2015 (ADAMS Accession No. ML15180A261), the NRC issued an Interim Staff Evaluation and audit report, respectively, on the licensee's progress implementing the FLEX strategies at the site. By letter dated July 28, 2016 (ADAMS Accession No. ML16214A251), the licensee submitted a compliance letter which stated that both units at Comanche Peak had achieved full compliance with Order EA-12-049. The July 28, 2016, letter also included the FIP for Comanche Peak in response to Order EA-12-049.

By letter dated December 14, 2016 (ADAMS Accession No. ML16334A173), the NRC staff issued a safety evaluation documenting the results of the NRC staff's review of the licensee's FLEX strategies for Comanche Peak. The safety evaluation concluded that the integrated plans, if implemented as described, will adequately address the requirements of Order EA-12-049.

A brief summary of Comanche Peak's FLEX strategies is listed below:

- For Phase 1, the heat sink for core cooling is provided by the four steam generators (SGs). Steam release from the SGs would be accomplished via the main steam safety valves or the SG atmospheric relief valves. The SGs are fed simultaneously by the unit's turbine-driven auxiliary feedwater (TDAFW) pump. The condensate storage tank is the initial water source to the TDAFW pump. Over a period of approximately 4 hours, the licensee will gradually cool down the reactor coolant system (RCS). During this time some fraction of the borated inventory from the nitrogen-pressurized accumulators would be expected to passively inject into the RCS.

To prevent a loss of vital instrumentation, operators will extend battery life to a minimum of 12 hours by shedding unnecessary loads. Initial load shedding will be completed within 2 hours and a second load shed is completed within 5 hours from the initiation of an extended loss of alternating current power (ELAP) event. No actions are required in Phase 1 for spent fuel pool makeup because the time to boil is sufficient to enable deployment of the Phase 2 equipment. Adequate SFP inventory exists to provide radiation shielding for personnel well beyond the time of boiling.

- For Phase 2, the primary strategy for core cooling is to continue using the SGs as a heat sink with the secondary inventory being supplied by the TDAFW pump. The licensee will pre-stage a portable SG/auxiliary feedwater low pressure FLEX pump capable of backing up this essential function. RCS boration will commence using a portable high-pressure FLEX pump no later than 14 hours into the ELAP and loss of ultimate heat sink event. A FLEX 480 volt alternating current (Vac) diesel generator (DG) will be deployed to repower the battery charges within 12 hours from the ELAP event initiation. The SFP makeup strategy consists of using either an overhead spray header fed through redundant FLEX connections located on the outside of the Fuel Building or deployment of portable spray nozzles near the SFP deck fed from the local fire protection hose stations. The overhead spray header will be pressurized using the multi-purpose high flow FLEX pump drawing suction from the refueling water storage tank.

- For Phase 3, the core cooling strategy is a continuation of the Phase 2 strategy with additional offsite equipment and resources. The SGs will be supplied with purified water from the diesel-powered mobile water treatment system supplied by the National Strategic Alliance of FLEX Emergency Response (SAFER) Response Center (NSRC). For Phases 1 and 2, the licensee's calculations demonstrate that no actions are required to maintain containment pressure below design limits. During Phase 3, containment cooling and depressurization would be accomplished by restoring the containment ventilation chiller and the containment air cooling and recirculation systems. Service water for cooling is supplied by a NSRC FLEX pump. The containment cooling fan would be powered by two 4160 Vac DGs supplied by the NSRC. An NSRC supplied diesel powered air compressor will be used to restore instrument air in containment.

3.2. Evaluation of Current FLEX Strategies

The licensee's February 9, 2017, MSA is intended to confirm that the mitigating strategies for beyond-design-basis external events have adequately addressed the Comanche Peak reevaluated flood hazard. As discussed above, the mechanisms not bounded by the CDB are LIP and the streams and rivers PMF. The licensee's evaluation was performed in accordance with the guidance found in Section G.4.1 of NEI 12-06, Revision 2. Section G.4.1 provides guidance for evaluating the existing FLEX strategies to determine if they can be implemented as designed given the impacts of the flood hazards described in the MSFHI letter.

Figure 3.2-1, which is adapted from the licensee's supplement to the flood hazard reevaluation report (FHRR) dated August 14, 2014 (ADAMS Accession No. ML14245A136), provides a site layout for the plant. Section 3.3 and 3.4 of this report provides the staff's assessment of the AE parameters and FED parameters, respectively, provided by the licensee in its MSA. The AE and FED parameters were found to be acceptable by the staff and are considered in the staff's assessment of the current FLEX strategies against the reevaluated hazard LIP and streams and rivers PMF that is provided below.

Local Intense Precipitation

As noted in the licensee's MSA, LIP was not considered in the plant design-basis or FLEX design-basis flood hazard. The MSFHI water level for the LIP event is 810.6 feet (ft.) National Geodetic Vertical Datum of 1929 (NGVD29). The licensee compared the FLEX equipment elevation to the maximum LIP flood levels and concluded that bottom portions of some electrical cabinets and panels could potentially be wetted, but it was concluded that there is no electrical equipment in the bottom portion of these cabinets. The licensee further concluded that no equipment important to FLEX or any connection points would be adversely impacted by this event. The licensee's evaluation concluded that the FLEX strategies can be performed as designed given the impact of the LIP and no additional flood protection measures or operator actions are required. The licensee's MSA included the following considerations:

- The maximum duration of inflow into any building entrance is 6.7 hours into the Turbine Building equipment ramp, which has a threshold elevation of 809.5 ft. The maximum duration of inflow at door entrances to safety related building areas, which have a threshold entrance elevation of 810.5 ft., is 0.4 hours.

- Water intrusion into plant buildings after peak LIP still water have receded, including any residual ponding adjacent to safety related buildings, does not cause any detrimental impact to FLEX equipment, deployment routes, connection points, storage locations, or staging locations and the strategies can still be performed with sufficient available time margin. The maximum flood height in the FLEX Equipment Storage Building due to LIP is 0.4 inches. The only equipment sensitive to water that is stored below 0.4 inches from the ground are battery minders. The licensee concluded, based on information provided by the vendor, that the battery minders may be submerged up to 1 meter of water without damaging the connected batteries as long as the input and output cords are intact.

- The Service Water Intake Structure (SWIS) operating deck is at elevation 796 ft.; however, according to the current design-basis internal flooding analysis for the SWIS, consequential internal flooding of the building cannot occur due to the open grating configuration at elevation 796 ft. This open grating design will route any flooding directly to the pump intake area below.

- Regarding AEs, the licensee concluded that the maximum hydrodynamic loads, debris loads, and effects of groundwater and sediment deposition/erosion would be minimal.

- Regarding FEDs, the licensee stated that the LIP is a 6 hour rainfall event, and hydrographs and catchments around the site show that the peak ponding at the plant site occurs within the first hour. The Comanche Peak FLEX strategies were designed based upon the assumption that no site access is available for the first 6 hours following the event. If the LIP occurs while equipment transportation or deployment haul path debris removal is being implemented, the license concluded that the equipment being used, due to its robust nature, will not be impacted by the rainfall event or ponding. The licensee further concluded that the time validation for FLEX strategies in areas susceptible to flooding has sufficient margin to reasonably account for an increase in the time required to perform activities due to the rainfall event.

Based on the evaluation of mitigating strategies against the LIP, the NRC staff finds that the licensee has adequately assessed this hazard and the FLEX strategies, if appropriately implemented, are reasonably protected from the beyond-design-basis LIP event.

Streams and Rivers Probable Maximum Flood

As noted in the licensee's MSA, the streams and rivers PMF plant design-basis and FLEX design-basis is 790.5 ft, which includes wave runup. The maximum MSFHI water level for this event, which includes wave runup, is 795.8 ft. NGVD 29 at the SWIS vertical face. The safe shutdown impoundment (SSI) pond PMF scenario, including wave runup, is 794.6 ft. NGVD29 and 794.2 ft. NGVD29 on the Squaw Creek Reservoir side of the dam and SSI side of the dam, respectively. The licensee concluded that no water intrusion into any plant building is caused by this streams and rivers PMF. The licensee further concluded that no equipment important to FLEX or any connection points would be adversely impacted by this event. The licensee's evaluation concluded that the FLEX strategies can be performed as designed given the impact of the streams and rivers PMF and no additional flood protection measures or operator actions are required. The licensee's MSA included the following considerations:

- The SSI dam is a seismically qualified dam with a top of crest elevation of 796 ft. The licensee concluded that this dam will maintain its structural integrity and perform its functions considering the streams and river PMF.
- The FED parameters are bounded by the FLEX design basis.
- Regarding AEs, the licensee concluded that the effects of hydrodynamic loads and debris loading are minimal. The licensee's evaluation included a review of erosion effects on the SSI dam.

Based on the evaluation of mitigating strategies against the streams and rivers PMF, the NRC staff finds that the licensee has adequately assessed this hazard and the FLEX strategies, if appropriately implemented, are reasonably protected from the beyond-design-basis streams and rivers PMF.

3.3 Evaluation of Associated Effects

The staff reviewed information provided by licensee regarding the reevaluated AE parameters for flood hazards not bounded by the CDB. The AE parameters related to water surface elevation (i.e., stillwater elevation with wind waves and runup effects) were previously reviewed by staff and were transmitted to the licensee via the MSFHI letter dated February 11, 2016. The AE parameters not bounded by the CDB are discussed below and are summarized in Table 3.3-1.

Local Intense Precipitation

For the LIP flood-causing mechanism, the licensee provided estimates of the hydrostatic and hydrodynamic loads in the following documents: 1) FHRR dated April 4, 2014 (ADAMS Accession No. ML14100A049); 2) in a supplement to the FHRR dated August 14, 2014 (ADAMS Accession No. ML14245A136); and 3) the February 9, 2017, MSA report. These estimates are based on the results of the numerical model that was used to analyze LIP flooding and are described in the FHRR.

The licensee stated in its MSA report and FHRR that the potential debris accumulation in the drainage system is accounted for and that possible clogging of any drainage ditch will not affect the system's flood-water-removal efficiency. The licensee also stated in its MSA report that the transient ponding due to LIP flooding may potentially have minor contributions to the groundwater hydrostatic loading effects; however, these effects are well within the existing design margin.

It was also reported in the MSA that safety-related plant structures except the SWIS were designed for hydrostatic loads with the design-basis ground water level at elevation 810 ft. Assuming a reevaluated LIP flooding induced increase in the hydrostatic load with peak flood level of 810.6 ft., the ground water hydrostatic pressure on the lowest safety-related building elevation of 773 ft. would increase by a ratio of 1.6 percent. The licensee further stated in its MSA report that this additional stress level is considered negligible. The MSA report also stated that the site characteristics that are described in the August 14, 2014, supplement to the FHRR make the effects of sediment erosion and deposition minimal.

Streams and Rivers Probable Maximum Flood

The streams and rivers flood-causing mechanism does not inundate the site; as a result, the licensee determined the AE parameters are not applicable for this flood-causing mechanism. The staff agrees with the licensee's approach is consistent with the guidelines provided in Appendix G of NEI 12-06, Revision 2.

The staff confirmed the licensee's statements by reviewing the licensee-provided documents and model input and output files for the LIP and riverine flood-causing mechanisms. The staff verified that inundation depths and flow velocities are acceptable and the modeling is reasonable for use as part of the MSA. Therefore, the staff agrees with the licensee's assessment of the AE parameters for LIP and streams and rivers flood-causing mechanisms.

Conclusion

In summary, the staff concludes the licensee's methods were appropriate and the AE parameter results for the flood-causing mechanisms not bounded by the CDB are reasonable for use in the MSA.

3.4 Evaluation of Flood Event Duration

The staff reviewed information provided by the licensee in the MSA, FHRR, and supplement to the FHRR, regarding the FED parameters needed to perform the MSA for flood hazards not bounded by the CDB. The FED parameters for the flood-causing mechanisms not bounded by the CDB are summarized in Table 3.4-1.

Local Intense Precipitation

For the LIP flood-causing mechanism, the maximum flood level is 810.6 ft. NGVD29 as stated in the MSA report, which exceeds the door sill elevations for plant buildings. The licensee stated that for the LIP flood event, the water surface elevation inundates the non-safety related Turbine Building for about 6.7 hours and the safety-related buildings for about 0.4 hours. The MSA report stated that the period of recession is 6.7 hours and the site does not credit any warning time for the LIP flood-causing mechanism.

The LIP flood-causing mechanism was modeled and the runoff from the event was evaluated using the U.S. Army Corps of Engineers Hydrologic Engineering Center - Hydrologic Modeling System (HEC-HMS) software version 3.5.0. The licensee simulated potential flood water levels within the protected power block area using the Hydrologic Engineering Center - River Analysis System (HEC-RAS) model version 4.1.0, and the results of these models were used to estimate FED parameters for the LIP event. The staff confirmed that the licensee's reevaluation of the inundation periods for LIP and associated drainage uses present-day methodologies and regulatory guidance. Although the licensee did not credit LIP warning time in the MSA, the staff notes that the licensee could implement the guideline provided by NEI 15-05, Revision 6, "Warning Time for Local Intense Precipitation Events," dated April 8, 2015 (ADAMS Accession

No. ML15104A158), to determine LIP warning time (as needed) for any future assessments, if needed. Guidance document NEI 16-05, Revision 1, "External Flood Assessment Guideline," dated June, 2015 (ADAMS Accession No. ML16309A156), defines the period of recession for LIP is the period floodwaters drop below a penetration or door threshold elevation and drains from the site. The staff has determined, based on the review of the licensee-provided LIP model output files, that the period of recession for the LIP flood-causing mechanism would be minimal.

Streams and Rivers Probable Maximum Flood

For the streams and rivers flood-causing mechanism, the maximum water surface elevation is 795.8 ft. including a wave runup height of 3.1 ft. This maximum flood level occurs at the vertical face of the SWIS. This flood is below the site grade of 810 ft. and does not cause inundation; therefore, FED parameters for this flood-causing mechanism were not discussed in the MSA.

Conclusion

In summary, the staff agrees with the licensee's conclusion related to determining the FED parameters as the approach is consistent with guidelines provided by Appendix G of NEI 12-06, Revision 2. Based on this review, the staff concludes that the licensee's FED parameters for the flood-causing mechanisms are reasonable and acceptable for use in the MSA.

4.0 CONCLUSION

The NRC staff has reviewed the information provided in the Comanche Peak MSA related to the FLEX strategies, as evaluated against the reevaluated hazard(s) described in Section 2 of this staff assessment, and found that:

- The FLEX strategies are not affected by the impacts of the MSFHI flood levels (including impacts due to the environmental conditions created by the MSFHI flood levels);
- The deployment of the FLEX strategies is not affected by the impacts of the MSFHI flood levels; and
- Associated effects and FED are reasonable and acceptable for use in the Comanche Peak MSA, and have been appropriately considered in the MSA.

Therefore, the NRC staff concludes that the licensee has followed the guidance in NEI 12-06, Revision 2. In addition, the staff concludes that the licensee has demonstrated that the mitigation strategies are reasonably protected, if appropriately implemented, from the reevaluated flood hazards conditions for beyond-design-basis external events for LIP and streams and rivers PMF, including AEs and FEDs.

TABLE 3.3-1: ASSOCIATED EFFECTS PARAMETERS NOT DIRECTLY ASSOCIATED WITH TOTAL WATER HEIGHT FOR FLOOD-CAUSING MECHANISMS NOT BOUNDED BY THE CURRENT DESIGN BASIS

Associated Effects Parameter	Local Intense Precipitation and Associated Drainage	Streams and Rivers (1)
Hydrodynamic loading at plant grade	Minimal(2)	Not Applicable
Debris loading at plant grade	Minimal	Not Applicable
Sediment loading at plant grade	Minimal	Not Applicable
Sediment deposition and erosion	Minimal	Not Applicable
Concurrent conditions, including adverse weather - Winds	Minimal	Not Applicable
Groundwater ingress	793/810.6 ft.(2)	Not Applicable
Other pertinent factors (e.g., waterborne projectiles)	Minimal	Not Applicable

1. The AE parameters for the streams and rivers flood-causing mechanism are not applicable because the plant site would not be inundated by this flooding mechanism.
2. The licensee reported in its MSA that the maximum groundwater elevations of 793 ft. MSL at the SWIS and 810.6 ft. MSL at other plant buildings for the LIP flood-causing mechanism, but determined the rate of hydrostatic load increase due to LIP-induced groundwater level increase would be minimal and within the design margin for the buildings (Luminant, 2017).

Table 3.4-1: Flood Event Durations for Flood-Causing Mechanisms Not Bounded by the Current Design Basis

Flood-Causing Mechanism	Time Available for Preparation for Flood Event	Duration of Inundation of Site	Time for Water to Recede from Site
Local Intense Precipitation and Associated Drainage	Minimal (use of NEI 15-05 (NEI, 2015), as needed)	6.7 hours (Non-safety-related Turbine Building) 0.4 hours (Safety-Related Buildings)	minimal
Streams and Rivers [1]	Not Applicable	Not Applicable	Not Applicable

1. The FED parameters for the streams and rivers flood-causing mechanism are not applicable because the plant site would not be inundated by this flooding mechanism.

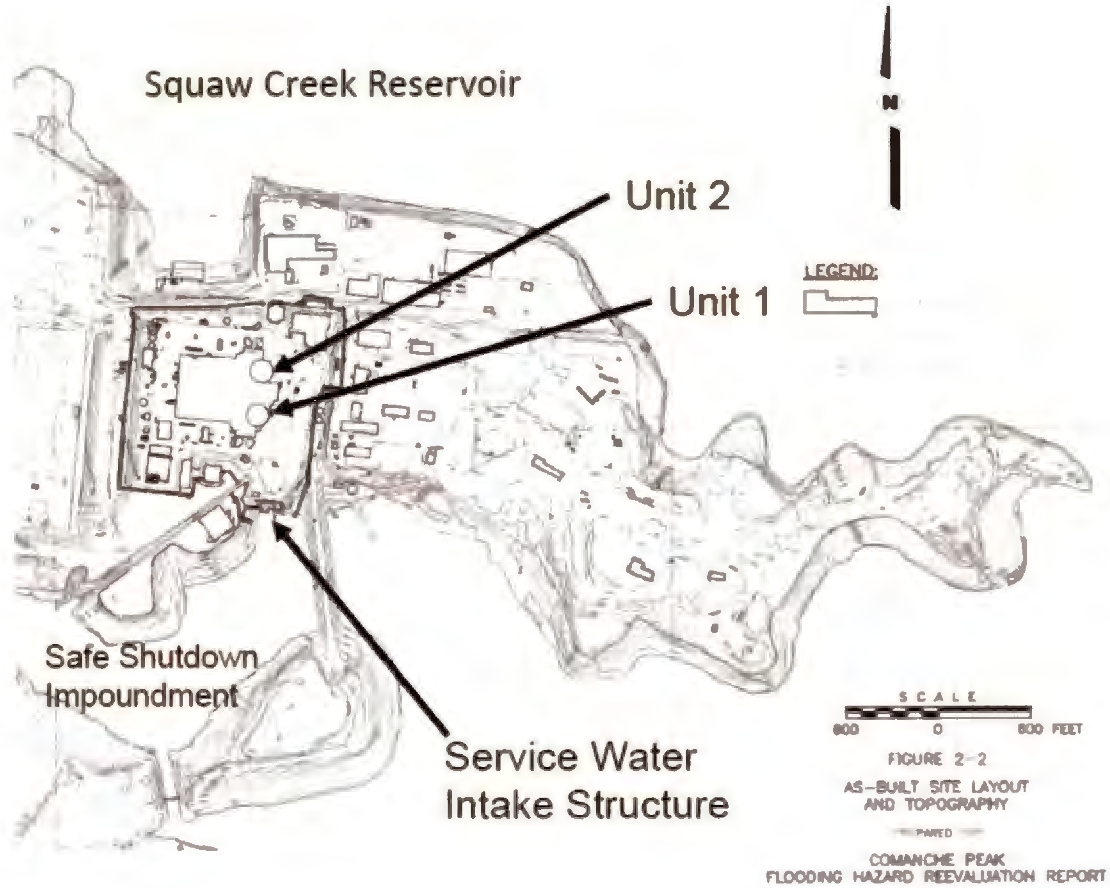

Figure 3.2-1 Comanche Peak Site Layout Adapted from Flood Hazard Reevaluation Report

COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2 – FLOOD HAZARD MITIGATION STRATEGIES ASSESSMENT DATED MAY 9, 2017

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