



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

May 4, 2023

**COMANCHE PEAK NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 - AUTHORIZATION  
AND SAFETY EVALUATION FOR PROPOSED ALTERNATIVE P-1 (EPID L-2022-LLR-0058)**

**LICENSEE INFORMATION**

**Recipient's Name and Address:** Mr. Ken J. Peters  
Senior Vice President and  
Chief Nuclear Officer  
Attention: Regulatory Affairs  
Vistra Operations Company LLC  
Comanche Peak Nuclear Power Plant  
6322 N FM 56  
P.O. Box 1002  
Glen Rose, TX 76043

**Licensee:** Vistra Operations Company LLC (Vistra OpCo)

**Plant Name and Unit:** Comanche Peak Nuclear Power Plant, Unit Nos. 1  
and 2 (Comanche Peak, Units 1 and 2)

**Docket Nos.** 50-445 and 50-446

**APPLICATION INFORMATION**

**Submittal Date:** July 20, 2022

**Submittal Agencywide Documents Access and Management System (ADAMS) Accession  
Nos.** ML22201A555

**Supplement Date:** December 7, 2022

**Supplement ADAMS Accession No.** ML22342B279

**Applicable Inservice Testing (IST) Program Interval and Interval Start/End Dates:**  
Comanche Peak, Units 1 and 2, fourth 10-year interval IST program start date are  
August 3, 2023, and are scheduled to end on August 2, 2033.

**Alternative Provision:** The applicant submitted Proposed Alternative P-1 for Comanche Peak,  
Units 1 and 2, under Title 10 of the *Code of Federal Regulations* (10 CFR),  
paragraph 50.55a(z)(2), on the basis that compliance with the American Society of Mechanical  
Engineers *Operation and Maintenance of Nuclear Power Plants* (ASME OM Code) as  
incorporated by reference in 10 CFR 50.55a, "Codes and standards," would result in hardship or  
unusual difficulty without a compensating increase in the level of quality or safety.

**Proposed Duration of Alternative:** The licensee requests that this alternative be authorized for the Comanche Peak, Units 1 and 2, fourth 10-year interval IST program.

**Applicable Code Edition and Addenda:** ASME OM Code, Division 1, Section IST, 2017 Edition, as incorporated by reference in 10 CFR 50.55a, for the fourth 10-year interval IST program at Comanche Peak, Units 1 and 2.

**Applicable Components and or System Description:**

The Vents and Drains System Safeguards Building Sump Pumps (SBSPs):

CP1-WPAPSS-01 CP2-WPAPSS-01  
CP1-WPAPSS-02 CP2-WPAPSS-02  
CP1-WPAPSS-03 CP2-WPAPSS-03  
CP1-WPAPSS-04 CP2-WPAPSS-04

**Applicable IST Requirements:**

ASME OM Code, subsection ISTB, “Inservice Testing of Pumps in Water-Cooled Reactor Nuclear Power Plants – Pre-2000 Plants,” paragraph ISTB-5200, “Vertical Line Shaft Centrifugal Pumps,” subparagraph (a), “Duration of Tests,” sub subparagraph (1) states that “For the Group A test and the comprehensive test, after pump conditions are as stable as the system permits, each pump shall be run at least 2 min. At the end of this time at least one measurement or determination of each of the quantities required by Table ISTB-3000-1 shall be made and recorded.”

ASME OM Code, subsection ISTB, paragraph ISTB-3540, “Vibration,” paragraph (b), states that “On vertical line shaft pumps, measurements shall be taken on the upper motor-bearing housing in three approximately orthogonal directions, one of which is the axial direction.”

ASME OM Code, subsection ISTB, paragraph ISTB-5221, “Group A Test Procedure,” states in part that “Group A tests shall be conducted with the pump operating as close as practical to a specified reference point and within the variances from the reference point as described in this paragraph. The test parameters shown in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph.”

ASME OM Code, subsection ISTB, paragraph ISTB-5223, “Comprehensive Test Procedure,” states in part that “Comprehensive tests shall be conducted with the pump operating as close as practical to a specified reference point and within the variances from the reference point as described in this paragraph. The test parameters shown in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph.”

**Brief Description of the Proposed Alternative:**

The licensee proposes an alternative to the requirements of the ASME OM Code to test the SBSPs to ensure that the pumps start on the proper level switch actuation, are capable of delivering the required flow to the waste holdup tank (WHT), and have a satisfactory vibration reading. The SBSP test will be conducted by pumping fluid while measuring flow and vibration (only in one direction). The licensee has proposed not to perform differential pressure measurements due to the potential for excessive radiation exposure to plant personnel.

The licensee states that the sump will be filled to a predetermined level, and the SBSPs will operate until the automatic low-level cutoff switch actuates. The sump will be pumped down rapidly (approximately 50 seconds) by one SBSP. Suction pressure will vary as sump level

changes; therefore, the 2-minute stabilization time and differential pressure measurement are not achievable. The SBSP test will require pumping the same quantity of fluid along a repeatable system path while measuring flow and vibration. Baseline reference values shall be established for flow and vibration. Alert and Required Action Limits for vibration will be established and maintained per the ASME OM Code, table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," for vertical line shaft centrifugal pumps. Vibration will be measured in a single direction due to the short pump run and the ability to acquire a single vibration reading during this time period. The acceptance criteria for flow will be greater than the design flow of 50 gallons per minute (gpm). The flowrate delivered will be trended to detect pump degradation and to ensure the SBSPs have adequate design margin.

The licensee states that U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.175, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Inservice Testing," August 1998 (ML003740149) will be used to define the SBSPs as low significant safety components (LSSCs).

For additional details on the licensee's request, please refer to the documents located at the ADAMS Accession Nos. identified above.

### **STAFF EVALUATION**

The SBSPs are vertical line shaft centrifugal pumps that are included in the risk-informed IST (RI-IST) plan for Comanche Peak, Units 1 and 2, and will remain in the RI-IST plan for the fourth 10-year interval IST program. As described in the letter dated December 7, 2022, the SBSPs will detect and mitigate passive failures in the emergency core cooling system and containment spray system following a postulated loss-of-coolant accident and prevent flooding of the safety-related systems. These pumps are classified as LSSCs in accordance with the licensee's RI-IST plan, and have a 6-year staggered test frequency. The staggered test frequency results in one SBSP per unit tested every 18 months.

The SBSPs are classified as Group A pumps per the ASME OM Code at Comanche Peak, Units 1 and 2. ASME OM Code, subsection ISTB, paragraph ISTB-5200(a)(1), requires that for "the Group A test and the comprehensive test, after pump conditions are as stable as the system permits, each pump shall be run at least 2 minutes. At the end of this time, at least one measurement or determination of each of the quantities required by [ASME OM Code, subsection ISTB,] Table ISTB-3000-1, shall be recorded."

The licensee requested an alternative to the 2-minute requirement for testing the SBSPs with the following bases:

1. The Safeguards Building sumps only contain sufficient water inventory for 50 seconds of pump run at 80 percent or greater design flow.
2. The SBSPs are not designed with a recirculation line to allow a pump to be run continuously at design flow conditions.
3. Direct access to the SBSPs would cause a significant burden because they are located inside the sump with the sump covered by 1 inch-thick steel plate.
4. Operating the pumps for greater than 50 seconds would require opening the sump and running water from a demineralized water source with temporary hoses. The resources

estimated to remove the steel plate, run demineralized water, and reestablish the design configuration are approximately 50 person-hours for each pump test versus approximately 9 person-hours for the proposed pump run of approximately 50 seconds.

Based on its review, the NRC staff finds that performance of the ASME OM Code-required test for the SBSPs at Comanche Peak, Units 1 and 2, would result in a hardship without a compensating increase in the level of quality or safety. In addition, the test would result in significant person-hours in potentially contaminated sump areas.

ASME OM Code, subsection ISTB, paragraphs ISTB-5221 and ISTB-5223, require that testing be performed where either pump flow or differential pressure is set, and the other parameter measured, recorded, and compared to its reference value. The licensee requested an alternative to these specific requirements of paragraphs ISTB-5221 and ISTB-5223 because, in the present design, there is no recirculation line from the discharge header back to the sumps. Further, there are no installed in-line pressure and flow instruments on the pump suction or discharge. The NRC staff finds that imposing the ASME OM Code-required test for the SBSPs at Comanche Peak, Units 1 and 2, would result in a hardship without a compensating increase in the level of quality or safety because it would require major piping modifications and installation of in-line pressure and flow instruments in the potentially contaminated sump area.

ASME OM Code, subsection ISTB, paragraph ISTB-3540(b), requires that for "vertical line shaft pumps, [vibration] measurements shall be taken on the upper motor-bearing housing in three approximately orthogonal directions, one of which is the axial direction." The licensee stated that direct access to the SBSPs would involve a significant burden because the pumps are inside the sump that is covered by 1-inch-thick steel plate with only the motors accessible to workers. These are small motors with only one location available for vibration measurement (i.e., motor inboard horizontal). As such, the licensee proposed to collect vibration measurements in the motor inboard horizontal direction, which is similar to that employed during the third 10-year interval IST program for Comanche Peak, Units 1 and 2. The licensee noted that the 1-inch thick steel plate will dampen any vibrations from these small motors. Therefore, taking vibration in three directions per the ASME OM Code would not provide significant information beyond the proposed single measurement. With respect to the single vibration measurement, the NRC staff finds additional vibration readings would not provide significant information, and installing additional vibration locations on these small motors would result in a hardship without a compensating increase in the level of quality and safety.

Because of the burden and hardship of performing the SBSP test in accordance with the ASME OM Code, subsection ISTB requirements in paragraphs ISTB-5200(a)(1), ISTB-5221, ISTB-5223, and ISTB-3540(b), the licensee proposed an alternative test as described above and, in the subsection, "Full Description of the Proposed Alternative," in the attachment to the proposed alternative dated July 20, 2022.

In Proposed Alternative P-1, the licensee requests to test the SBSPs to ensure that the pumps start on the proper level switch actuation, are capable of delivering the required flow to the WHT, and have a satisfactory vibration reading. The flow path to the WHT has a greater system resistance than the normal lineup due to the piping configuration at Comanche Peak, Units 1 and 2. Pumping 50 gpm or more to the WHT demonstrates that adequate head was developed to overcome system resistance with greater confidence that the ASME OM Code requirements for operational readiness of the SBSPs have been met. The licensee noted that the required head to pump to the WHT is greater than the required head to discharge to the floor drain tank, which is the normal lineup. The NRC staff finds that this proposed alternative test provides

reasonable assurance that the SBSPs are capable of performing their safety functions. Therefore, the NRC staff finds this proposed alternative test for the SBSPs to be acceptable.

Based on the above, the NRC staff finds that compliance with the ASME OM Code, subsection ISTB requirements in paragraphs ISTB-5200(a)(1), ISTB 3540(b), ISTB-5221, and ISTB-5223 for the SBSPs at Comanche Peak, Units 1 and 2, would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff also finds that the proposed alternative test provides reasonable assurance that the SBSPs will be operationally ready to perform their safety functions at Comanche Peak, Units 1 and 2.

### **CONCLUSION**

The NRC staff has determined that complying with the specified requirements described in the licensee's request referenced above would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The proposed alternative provides reasonable assurance that the Comanche Peak, Units 1 and 2, SBSPs are operationally ready.

The NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(2).

The NRC staff authorizes the use of Proposed Alternative P-1 at Comanche Peak, Units 1 and 2, for the fourth 10-year interval IST program for Comanche Peak, Units 1 and 2, which begins on August 3, 2023, and ends on August 2, 2033.

All other ASME OM Code requirements for which an alternative was not specifically requested and authorized remain applicable.

Principal Contributors: Gurjendra Bedi  
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Date: May 4, 2023

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Office of Nuclear Reactor Regulation

cc: Listserv

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 -  
AUTHORIZATION AND SAFETY EVALUATION FOR PROPOSED  
ALTERNATIVE P-1 (EPID L-2022-LLR-0058) DATED MAY 4, 2023

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**ADAMS Accession No. ML23121A220**

**\*via email**

**NRR-028**

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