



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

June 26, 2013

Mr. Rafael Flores
Senior Vice President and
Chief Nuclear Officer
Attention: Regulatory Affairs
Luminant Generation Company LLC
P.O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2 – REQUEST FOR RELIEF P-1 FOR INSERVICE TESTING PLAN FOR PUMPS AND VALVES FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE FOR OPERATION AND MAINTENANCE OF NUCLEAR POWER PLANTS FOR THE THIRD INTERVAL OF INSERVICE TESTING PLAN (TAC NOS. ME9259 AND ME9260)

Dear Mr. Flores:

By letter dated August 16, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12240A052, as supplemented by letter dated March 21, 2013 (ADAMS Accession No. ML13100A132), Luminant Generation Company LLC (the licensee) submitted Relief Request No. P-1 for Comanche Peak Nuclear Power Plant (CPNPP), Units 1 and 2, Inservice Testing (IST) Plan for Pumps and Valves. The licensee requested relief from certain testing requirements for Safeguards Building Sump Pumps (SBSPs) pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(a)(3)(i) for the third 10-year IST interval, which begins on August 3, 2013, and ends on August 2, 2023.

The licensee requested authorization to use an alternative test instead of the requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) for SBSPs at CPNPP, Units 1 and 2. Specifically, the licensee requested to test the pumps to ensure that the pumps start on the proper level switch actuation, is capable of delivering the required flow to the waste hold up tank, and have a satisfactory vibration reading. The licensee has proposed not to perform differential pressure measurement due to the potential for additional radiation exposure to the plant personnel.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the request and concluded that compliance with the ASME OM Code requirements for the SBSPs would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety, and the proposed alternative provides a reasonable assurance that the SBSPs are operationally ready. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative described in Relief Request P-1 is authorized for the third 10-year IST program interval for CPNPP, Units 1 and 2.

R. Flores

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All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject request remain applicable.

The NRC staff's safety evaluation is enclosed. If you have any questions, please contact Balwant K. Singal at 301-415-3016 or by e-mail at Balwant.Singal@nrc.gov.

Sincerely,



Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure:
As stated

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF NO. P-1

THIRD 10-YEAR INSERVICE TESTING INTERVAL PLAN

LUMINANT GENERATION COMPANY LLC

COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-445 AND 50-446

1.0 INTRODUCTION

By letter dated August 16, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12240A052, as supplemented by letter dated March 21, 2013 (ADAMS Accession No. ML13100A132), Luminant Generation Company LLC (the licensee) submitted Relief Request No. P-1 for Comanche Peak Nuclear Power Plant (CPNPP), Units 1 and 2, Inservice Testing (IST) Plan for Pumps and Valves. The licensee requested relief from certain testing requirements for Safeguards Building Sump Pumps (SBSPs) pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(a)(3)(i) for the third 10-year IST interval.

The licensee requested U.S. Nuclear Regulatory Commission (NRC) authorization to use an alternative test instead of the requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) for SBSPs at CPNPP, Units 1 and 2. Specifically, the licensee requested to test the pumps to ensure that the pumps start on the proper level switch actuation, is capable of delivering the required flow to the waste holdup tank (WHT), and have a satisfactory vibration reading. The licensee has proposed not to perform differential pressure measurement due to the potential for additional radiation exposure to the plant personnel.

2.0 REGULATORY EVALUATION

Paragraph 50.55a(f), "Inservice testing requirements," of 10 CFR requires, in part, that IST of certain ASME Code Class 1, 2, and 3 components must meet the requirements of the ASME OM Code and applicable addenda, except where alternatives have been authorized by the NRC pursuant to paragraphs 10 CFR 50.55a(a)(3)(i) or 10 CFR 50.55a(a)(3)(ii).

In proposing alternatives, a licensee must demonstrate that the proposed alternatives provide an acceptable level of quality and safety (10 CFR 50.55a(a)(3)(i)) or compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety (10 CFR 50.55a(a)(3)(ii)).

Enclosure

At CPNPP, Units 1 and 2, the Code of record for the third 10-year IST interval is the 2004 Edition through 2006 Addenda of the ASME OM Code. The CPNPP, Units 1 and 2 third 10-year IST program interval begins on August 3, 2013, and is currently scheduled to end August 2, 2023.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Request for Alternative

The licensee has requested authorization to use an alternative test instead of the requirements of the ASME OM Code. Specifically, the licensee requested to test the pumps to ensure that the pumps start on the proper level switch actuation, is capable of delivering the required flow to the WHT, and have a satisfactory velocity-based vibration reading. The licensee has proposed not to perform differential pressure measurement due to the potential for additional radiation exposure to the plant personnel.

3.1.1 Components Affected

This relief request is for the following ASME Code Class 3 SBSPs:

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

3.1.2 Applicable Code Requirements

ISTB-5200(a), "Duration of Tests," paragraph (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.

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.

ISTB-5221, "Group A Test Procedure," states, in part, that

Group A tests shall be conducted with the pump operating at a specified reference point. The test parameters shown in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph.

ISTB-5223, "Comprehensive Test Procedure," states, in part, that

Comprehensive tests shall be conducted with the pump operating at a specified reference point. The test parameters shown in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph.

3.1.3 Licensee's Basis for Requesting Relief

In its letter dated August 16, 2012, the licensee stated:

The reason for relief from ISTB-5200(a)(1) is because the Safeguards Building sump does not contain sufficient water inventory for 2 minutes duration at 80% or greater of design flow. The sump pumps are not designed with a recirculation line (mini-flow or test header) that allows a pump to be run continuously at design flow conditions.

By letter dated March 21, 2013, in response to an NRC staff request for additional information (RAI) dated February 19, 2013 (ADAMS Accession No. ML13050A183), the licensee stated, in part, that

Direct access to the Safeguards Building Sump Pumps would be a significant burden since they are inside the sump and the sump is covered by a 1" thick steel plate []. To run the pumps for greater than 50 seconds would require opening the sump and running water from a demineralized water source with temporary hoses. Performing this test would incur significant effort. The man hours estimated to remove the plate, run demineralized water, and reestablish the design configuration is approximately 50 man hours for each pump train (versus approximately 9 man hours for each pump in accordance with currently approved relief request P-2) [and proposed alternative described in relief request P-1].

In response to the NRC staff's RAI, in its letter dated March 21, 2013, the licensee stated that since the pumps are under a 1-inch-thick steel plate, only the motors are accessible by workers. These are small motors with only one location (i.e., Motor Inboard Horizontal (MIH), for vibration measurement). The 1-inch-thick steel plate is stiff and will dampen any vibrations. The trending of three vibration readings would not provide any additional trending information beyond the current single MIH measurement. During normal operations, these pumps are not used continuously. Therefore, the use of a single vibration reading is an acceptable alternative to the ISTB-3450(b) requirement.

In its letter dated August 16, 2012, the licensee stated, in part, that:

The reason for relief from ISTB-5221 and ISTB-5223 is because there are no plant installed pressure or differential pressure instruments on the suction or discharge of the pump.

Previously the SBSPs were tested by setting flow at 0 gpm [gallons per minute] (i.e. dead head the pump) and differential pressure was calculated. The suction

pressure was calculated by measuring an elevation between the sump cover and water level within the sump. This method was abandoned due to the ALARA [As Low As Reasonable Achievable] concerns of the sump potentially being contaminated.

The test method of dead heading the SBSPs is adverse to the condition of the pumps and is no longer performed. The design of the SBSPs has been reviewed and it was determined that significant plant modifications would have to be performed without any appreciable benefit to safety to enable testing in compliance with ASME OM ISTB-5200(a), ISTB-5221, ISTB-5223, and ISTB-3540(b).

3.1.4 Licensee's Proposed Alternative Testing

In its application dated August 16, 2012, the licensee stated, in part, that

To meet the operational readiness requirements for these pumps, a test can be performed that demonstrates the pump can meet its intended safety functions. This test would require that the pump start on the proper level switch actuation, determine that the pump is capable of delivering a minimum of 50 gpm to the Waste Holdup Tank, and have velocity-based vibration readings that are satisfactory. Differential pressure measurement is not required to show adequate pump performance. Differential pressure measurement creates additional radiation exposure to personnel (ALARA) because the sump is potentially contaminated. Pumping 50 gpm or more to the Waste Holdup Tank demonstrates that adequate head was developed to overcome system resistance with greater confidence that the ASME OM Code requirements for operational readiness have been met. The required head to pump to the Waste Holdup Tank is greater than the required head to discharge to the Floor Drain Tank, which is the normal lineup.

The proposed test consists of the following: The sump will be filled to a predetermined level and the pump will operate until the automatic low-level cutoff switch actuates. The sump will be pumped down rapidly (approximately 50 seconds) by one pump. Suction pressure will vary as sump level changes; therefore, the 2 minute stabilization time and differential pressure measurement are not achievable. The test will require pumping the same quantity of fluid along a repeatable system path while measuring flow and vibration. A baseline reference shall be established for flow and vibration. Alert and Required Action Limits for vibration will be established and maintained as per Table ISTB-5221-1 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 gpm. The flowrate delivered will be trended for detecting pump degradation to ensure the SBSPs have adequate design margin.

In addition, Regulatory Guide 1.175, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Inservice Testing," [August 1998 (ADAMS Accession

No. ML003740149)] states that for Low Safety Significant Components (LSSCs), like the SBSPs, the testing may be less rigorous. This philosophy of demonstrating that the SBSPs have adequate design margin (greater than 50 gpm) is consistent with Regulatory Guide 1.175 testing strategy for LSSCs.

The SBSPs are small capacity pumps, compared to other pumps in the plant, with a capacity of greater than 50 gpm. The SBSPs are designed to pump a working volume, and not expected to run continuously. The SBSPs run intermittently in their normal and emergency modes. They turn on following a high sump level actuation and turn off following low sump level actuation. Trending flow against the required flow rate of 50 gpm will provide adequate means of demonstrating acceptable pump operation.

The SBSPs are of low safety significance and are not explicitly modeled in the Probabilistic Risk Assessment (PRA) for internal events analysis. As stated previously, the SBSPs are installed to prevent flooding from a LOCA [loss-of-coolant accident]. Alarms associated with these pumps alert the operator of potential leakage in the safeguards building and mitigate the consequences of the leakage. The proposed alternate test will provide reasonable assurance that the sump pumps will perform their intended functions, and not impact the assumptions in the PRA assessment.

The basis for classifying the Safeguards Building Sump Pumps as active is they mitigate continuous system leakage in the Safeguard Building at a flow rate of 1 gpm. These pumps also provide credited positive indication to the Control Room of flooding in the Safeguards Building from ESF [engineered safety features] equipment. The performance requirements for these pumps are unlike any other pumps in the Risk-Informed Inservice Testing Plan. These pumps are not required to provide a significant flow at a required head to prevent or mitigate any accident or maintain the plant in a safe shutdown condition. Modifications to enable testing in compliance with ASME OM code would not result in an increase to safety.

The proposed alternate test simulates expected pump operation and demonstrates the pumps' capability to meet the unique performance requirements of these pumps. Performance of this test will clearly demonstrate that the pumps can achieve their intended safety functions.

There is no change to the design functions of the sump pumps. This change does not impact the safety analysis as described in the FSAR [Final Safety Analysis Report].

3.2 NRC Staff Evaluation

The SBSPs are vertical line shaft centrifugal pumps that are included in the CPNPP Risk-Informed IST Plan. The SBSPs detect and mitigate passive failures in the emergency core cooling system and containment spray system following a LOCA and prevent flooding of the safety-related systems. These pumps are classified as LSSCs in accordance with the

licensee's Risk-Informed IST Plan, and have a 6-year staggered test frequency. The staggered test frequency results in one pump per unit tested every 18 months.

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 Table ISTB-3000-1 shall be made and recorded.

The licensee requested relief from the 2-minute requirement because of the following reasons:

- (1) the Safeguards Building sumps only contain sufficient water inventory for 50 seconds pump run at 80 percent or greater of design flow,
- (2) the sump pumps are not designed with a recirculation line that allows a pump to be run continuously at design flow conditions,
- (3) direct access to the SBSPs would be a significant burden since they are inside the sump and the sump is covered by 1-inch-thick steel plate, and
- (4) to run the pumps for greater than 50 seconds would require opening the sump and running water from a demineralized water source with temporary hoses. The man hours estimated to remove the plate, run demineralized water, and reestablish the design configuration is approximately 50 man hours for each pump test versus approximately 9 man hours for the proposed pump run of approximately 50 seconds.

The NRC staff agrees with the above reasons and concludes that to perform the ASME OM Code-required test would result in hardship and incur significant man hours in potentially contaminated sump areas.

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 relief from these specific requirements of ISTB-5221 and ISTB-5223, because in the present design, there is no recirculation line from the discharge header back to the sumps and there are no installed on-line pressure and flow instruments on the pump suction or discharge. The NRC staff concludes that imposing the ASME OM Code-required test would result in significant hardship for the licensee because it would require major piping modifications and installation of on-line pressure and flow instruments in potentially contaminated sump areas.

ISTB-3540(b) requires that on 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 be a significant burden since they are inside the sump and the sump is covered by 1-inch-thick steel plate. As such, the licensee proposed to take vibration measurements at the MIH direction, which is similar to that employed in the second IST program interval for CPNPP, Units 1 and 2. Since vibration is taken in one MIH direction, the licensee requested relief from the three direction requirements of ISTB-3540(b). The licensee noted that these motors are very small, and the

1-inch-thick steel plate is stiff, which will dampen any vibrations. Therefore, taking vibration in three directions, as required by the ASME OM Code, would not provide any additional information beyond the current single measurement. With respect to the single vibration measurement, the NRC staff agrees with the licensee that readings from additional vibration readings would not provide any significant information, and installing additional vibration locations on a small motor 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 test in accordance with the ASME OM Code requirements of ISTB-5200(a)(1), ISTB-5221, ISTB-5223, and ISTB-3540(b), the licensee proposed the following alternative test. Specifically, in its letter dated August 16, 2012, the licensee stated, in part, that

The sump will be filled to a predetermined level and the pump will operate until the automatic low-level cutoff switch actuates. The sump will be pumped down rapidly (approximately 50 seconds). Suction pressure will vary as sump level changes; therefore, the 2 minute stabilization time and differential pressure measurement are not achievable. The test will require pumping the same quantity of fluid along a repeatable system path while measuring flow and vibration. A baseline reference value shall be established for flow and vibration. Alert and Required Action Limits for vibration will be established and maintained as per Table ISTB-5221-1 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 gpm. The flowrate delivered will be trended for detecting pump degradation to ensure the SBSPs have adequate design margin.

The flow path to the WHT has a greater system resistance due to piping configuration and, therefore, the required head to pump the required flow rate of 50 gpm to the WHT is greater, and thus more conservative than the required head to discharge to the Floor Drain Tank, which is the normal lineup following the LOCA. The NRC staff concludes that this proposed alternative is more conservative than the ASME OM Code-required test for demonstrating acceptable pump operation as well as the capability of SBSPs to perform their intended safety functions and, therefore, is acceptable.

As discussed above, the NRC staff concludes that the licensee's proposed alternative provides a reasonable level of assurance that the SBSPs will perform their intended safety function, and imposing the ASME OM Code-required test would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

Based on the above, the NRC staff concludes that compliance with the ASME OM Code requirements of ISTB-5200(a)(1), ISTB 3540(b), ISTB-5221, and ISTB-5223 for the SBSBs would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety, and the proposed alternative provides a reasonable assurance that the SBSBs are operationally ready. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative described in Relief Request P-1 is authorized for the third 10-year IST program interval for CPNPP, Units 1 and 2, which begins on August 3, 2013, and ends on August 2, 2023.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the proposed alternative remain applicable.

Principal Contributor: John Huang, NRR/DE/EPNB

Date: June 26, 2013

R. Flores

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All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject request remain applicable.

The NRC staff's safety evaluation is enclosed. If you have any questions, please contact Balwant K. Singal at 301-415-3016 or by e-mail at Balwant.Singal@nrc.gov.

Sincerely,

/ RA /

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure:
As stated

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