



LIC-15-0089

10 CFR 50.55a

August 27, 2015

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Fort Calhoun Station, Unit No. 1
Renewed Facility Operating License No. DPR-40
NRC Docket No. 50-285

Subject: Submittal of Relief Requests Associated with the Fifth Inservice Testing Interval

The purpose of this letter is to request approval of proposed relief requests in accordance with 10 CFR 50.55a, "Codes and standards." The attached relief requests are associated with the Fifth 10 -Year Inservice Testing (IST) Program Interval for Fort Calhoun Station (FCS), Unit No. 1. The Fifth 10 -Year Interval begins on June 7, 2016 and is required by 10 CFR 50.55a(f)(4) to comply with the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code (2004 Edition through Addenda OMB-2006).

The FCS IST Fifth 10-year interval will be in effect from June 7, 2016 to June 6, 2026. Accordingly, approval of the attached relief requests is requested by June 7, 2016.

This letter contains no regulatory commitments.

Should you have any questions or require additional information, please contact Mr. Bill R. Hansher at (402) 533-6894.

Respectfully,

Louis P. Cortopassi
Site Vice President and CNO

LPC/JDR/mle

- Attachments:
1. List of Fort Calhoun Station Inservice Testing Program Fifth 10-Year Interval Proposed Relief Requests
 2. Fort Calhoun Station Inservice Testing Program Fifth 10-Year Interval Proposed Relief Requests

Fort Calhoun Station Unit No. 1
Inservice Testing Program Fifth 10-Year Interval
Proposed Relief Requests

Designator	Description	Comments
G-1	Inservice Testing Frequency per Code Case OMN-20	New relief request
P-1	Low Pressure Safety Injection and Containment Spray Pumps Vibration Limits	Approved for Fourth IST Interval
P-2	Adjusting Hydraulic Parameters to Specified Reference Points per Code Case OMN-21	New relief request

**10 CFR 50.55a Request Number G-1
Inservice Test Frequency Per Code Case OMN-20
Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)
-- Hardship or Unusual Difficulty without Compensating
Increase in Level of Quality and Safety --**

1. ASME Code Component(s) Affected

All pumps and valves contained within the Fort Calhoun Station (FCS) Inservice Testing (IST) Program scope.

2. Applicable Code Edition and Addenda

ASME OM Code-2004 Edition, through Addenda OMB-2006.

3. Applicable Code Requirement(s)

This request applies to the frequency specifications of the ASME OM Code. The frequencies for tests given in the ASME OM Code do not include a tolerance band.

ISTA-3120(a) – "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

ISTB-3400 – Frequency of Inservice Tests; "An inservice test shall be run on each pump as specified in Table ISTB-3400-1". Table ISTB-3400-1 lists two frequencies – quarterly and biennially.

ISTC-3510 – Exercising Test Frequency; "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months,..."

ISTC-3540 – Manual Valves; "Manual Valves shall be full-stroke exercised at least once every 2 years, except where adverse conditions may require the valve to be tested more frequently to ensure operational readiness."

ISTC-3630(a) – Frequency; "Tests shall be conducted at least once every 2 years."

ISTC-3700 – Position Verification Testing; "Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."

ISTC-5221(c)(3) – "At least one valve from each group shall be disassembled and examined at each refueling outage; all valves in a group shall be disassembled and examined at least once every 8 years."

Appendix I, I-1320(a) – Test Frequencies, Class 1 Pressure Relief Valves; "Class 1 pressure relief valves shall be tested at least once every 5 years..."

Appendix I, I-1330 – Test Frequency, Class 1 Nonreclosing Pressure Relief Devices; "Class 1 nonreclosing pressure relief devices shall be replaced every 5 years..."

Appendix I, I-1340 – Test Frequency, Class 1 Pressure Relief Valves that are used for Thermal Relief Application; Refers to I-1320 for test frequency.

Appendix I, I-1350 – Test Frequency, Classes 2 and 3 Pressure Relief Valves; "Classes 2 and 3 pressure relief valves, with the exception of PWR main steam safety valves, shall be tested every 10 years, ..."

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Appendix I, I-1360 – Test Frequency, Classes 2 and 3 Nonreclosing Pressure Relief Devices; “Classes 2 and 3 nonreclosing pressure relief devices shall be replaced every 5 years, ...”

Appendix I, I-1370 – Test Frequency, Classes 2 and 3 Primary Containment Vacuum Relief Valves; “Tests shall be performed on all Classes 2 and 3 containment vacuum relief valves at each refueling outage or every 2 years, ...”

Appendix I, I-1380 – Test Frequency, Classes 2 and 3 Vacuum Relief Valves Except for Primary Containment Vacuum Relief Valves; “All Classes 2 and 3 vacuum relief valves shall be tested every 2 years, ...”

Appendix I, I-1390 – Test Frequency, Classes 2 and 3 Pressure Relief Devices that are used for Thermal Relief Application; “Tests shall be performed on all Classes 2 and 3 relief devices used in thermal relief application every 10 years,”

Appendix II, II-4000(a)(1)(e) – Performance Improvement Activities; Subparagraph (1)(e) requires the identification of the interval for each activity.

Appendix II, II-4000(b)(1)(e) – Optimization of Condition Monitoring Activities; Subparagraph (1)(e) requires the identification of the interval for each activity.

4. Reason for Request

Pursuant to 10 CFR 50.55a, “Codes and Standards,” paragraph (z)(2), an alternative is requested to the frequency specifications of the ASME OM Code. The basis of this request is that the Code requirements present an undue hardship without a compensating increase in the level of quality or safety.

ASME OM Code Section IST establishes the inservice test frequencies for all components within the scope of the Code. The frequencies (e.g., quarterly) have always been interpreted as “nominal” frequencies (generally as defined in Table 3.2 of NUREG 1482, Revision 2) and Owners routinely applied the surveillance extension time period (i.e., grace period) contained in the plant Technical Specifications (TS) Surveillance Requirements (SRs). The TS typically allow for a less than or equal to 25% extension of the surveillance test interval to accommodate plant conditions that may not be suitable for conducting the surveillance (TS SR 3.0.1 at FCS). However, regulatory issues have been raised concerning the applicability of the TS “Grace Period” to ASME OM Code required inservice test frequencies.

The lack of a tolerance band on the ASME OM Code inservice test frequencies restricts operational flexibility. There may be a conflict where a surveillance test could be required (i.e., its frequency could expire), but where it is not possible or not desired that it be performed until sometime after a plant condition or associated Limiting Condition for Operation (LCO) is within its applicability. Therefore, to avoid this conflict, the surveillance test should be performed when it can be and should be performed.

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The NRC recognized this potential issue in the TS by allowing a frequency tolerance as described in FCS TS SR 3.0.1. The lack of a similar tolerance applied to OM Code testing places an unusual hardship on the plant to adequately schedule work tasks without operational flexibility.

Thus, just as with TS required surveillance testing, some tolerance is needed to allow adjusting OM Code testing intervals to suit the plant conditions and other maintenance and testing activities. This assures operational flexibility when scheduling surveillance tests that minimize the conflicts between the need to complete the surveillance and plant conditions.

5. Proposed Alternative and Basis for Use

FCS proposes the use of ASME OM Code Case OMN-20 for flexibility in IST scheduling. OMN-20 was published in the 2012 edition of the ASME OM Code and is applicable to all earlier editions and addenda.

The ASME OM Code establishes component test frequencies that are based either on elapsed time periods (e.g., quarterly, 2 years, etc.) or on the occurrence of plant conditions or events (e.g., cold shutdown, refueling outage, upon detection of a sample failure, following maintenance, etc.).

- a. Components whose test frequencies are based on elapsed time periods shall be tested at the frequencies specified in ASME OM Code Section IST with a specified time period between tests as shown in the table below.

Frequency	Specified Time Period Between Tests (all values are 'not to exceed'; no minimum periods are specified)
Quarterly (or every 3 months)	92 days
Semiannually (or every 6 months)	184 days
Annually (or every year)	366 days
x Years	x calendar years where 'x' is a whole number of years ≥ 2

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The specified time period between tests may be reduced or extended as follows:

- 1) For periods specified as less than 2 years, the period may be extended by up to 25% for any given test.
- 2) For periods specified as greater than or equal to 2 years, the period may be extended by up to 6 months for any given test.
- 3) All periods specified may be reduced at the discretion of the owner (i.e., there is no minimum period requirement).

Period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (e.g., performance of the test would cause an unacceptable increase in the plant risk profile due to transient conditions or other ongoing surveillance, test or maintenance activities). Period extensions are not intended to be used repeatedly merely as an operational convenience to extend test intervals beyond those specified.

Period extensions may also be applied to accelerated test frequencies (e.g., pumps in Alert Range) and other less than two year test frequencies not specified in the table above.

Period extensions may not be applied to the test frequency requirements specified in Subsection ISTD, Preservice and Inservice Examination and Testing of Dynamic Restraints (Snubbers) in Light-Water Reactor Nuclear Power Plants, as Subsection ISTD contains its own rules for period extensions.

- b. Components whose test frequencies are based on the occurrence of plant conditions or events (e.g., cold shutdown, refueling outage, upon detection of a sample failure, following maintenance, etc.) may not have their period between tests extended except as allowed by the ASME OM Code.

As currently written, ASME OM Code requirements do not allow testing period extensions that provide an allowance for the performance of ASME OM Code testing. As a result, this places an unusual hardship on FCS's ability to schedule and perform ASME OM Code testing without a compensating increase in the level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative identified will be utilized during the entire fifth 120 month Inservice Test interval (beginning June 7, 2016 and concluding on June 6, 2026). Note that the fourth IST interval was previously extended as documented in Reference 2.

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7. Precedence

Similar requests were approved for:

- a. Callaway Plant Unit 1, (Docket No. 50-483), Request No. PR-04, as discussed in NRC Safety Evaluation Report (SER) dated July 15, 2014 (TAC Nos. MF2784 through MF2789). (ML14178A769).
- b. Dresden Nuclear Power Station, 10 CFR 50.55a Request RV-01, NRC SER dated October 31, 2013, TAC Nos. ME9865, ME9866, ME9869, ME9870 and ME9872. (ML13297A515).
- c. Three Mile Island Nuclear Station, 10 CFR 50.55a request VR-01, NRC SER dated August 15, 2013, TAC Nos. MF0046, MF0047 and MF0048. (ML13227A024).
- d. Quad Cities Nuclear Power Station, Units 1 and 2 (NRC Dockets 50-254 and 50-265), 10 CFR 50.55a Request No. RV-01, as discussed in NRC SER dated February 14, 2013 (TAC Nos. ME7981 through ME7995). (ML13042A348).

8. References

1. Fort Calhoun Station Technical Specification Surveillance Requirements:
 - a. Section 3.0.1 (25% extension)
 - b. Section 3.0.2 (surveillance intervals)
 - c. Section 3.0.3 (3.0.1 and 3.0.2 applicable to all codes and standards referenced in TS)
2. Letter from OPPD, (L. Cortopossi) to NRC (Document Control Desk), Revised In-service Inspection (ISI) and In-service Test (IST) Interval End Dates as a Result of Extended Refueling Outage, dated January 21, 2014 (LIC-14-0002). (ML14022A258).
3. NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants: Inservice Testing of Pumps and Valves and Inservice Examination and Testing of Dynamic Restraints (Snubbers) at Nuclear Power Plants, dated October 2013, (ML13295A020).
4. ASME OM Code 2004 Edition through Addenda OMb-2006.

**10 CFR 50.55a Request Number P-1
 Low Pressure Safety Injection and Containment Spray Pumps Vibration Limits
 Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)
 --Hardship or Unusual Difficulty Without Compensating
 Increase in Level of Quality or Safety--**

1. ASME Code Component(s) Affected

PUMP	FUNCTION	PUMP TYPE	SYSTEM	ASME CLASS	ISTB-2000 GROUP
SI-1A, 1B	Low Pressure Safety Injection	Horizontal Centrifugal	Safety Injection	2	A
SI-3A, 3B, 3C	Containment Spray	Horizontal Centrifugal	Containment Spray	2	A

2. Applicable Code Edition and Addenda

ASME OM Code 2004 Edition through 2006 Addenda

3. Applicable Code Requirement

ISTB Table ISTB-5121-1, Centrifugal Pumps Test Acceptance Criteria.

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (z)(2), relief is requested from the requirement of ASME OM Code Table ISTB-5121-1 absolute vibration limits during Group A pump testing. Table ISTB-5121-1 specifies the vibration limits for centrifugal pumps operating at or above 600 rpm are the following for both the Group A and the comprehensive pump test:

Reference Value	Acceptable	Alert	Required Action
V_r	$\leq 2.5 V_r$	$>2.5 V_r - 6.0 V_r$ or $>0.325 - 0.70$ in/sec	$>6.0 V_r$ or >0.70 in/sec

The absolute limits for vibration of .325 in / sec for Alert and .70 in / sec for Required Action are too restrictive for the Ft. Calhoun Low Pressure Safety Injection (LPSI) and Containment Spray (CS) pumps during Group A testing as they are normally above those limits when tested. No relief is requested for Comprehensive Pump Test (CPT) Table ISTB-5121-1 vibration limits since vibration levels subside at these higher flow conditions.

These pumps have exhibited these higher vibration levels their entire service life when operated on mini-flow, which is the normal alignment for Group A testing. The LPSI and CS pumps are all of very similar design. All pumps are Ingersoll Rand Model 6UCL.

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The pumps are horizontal centrifugal single stage pumps. Pump hydraulic characteristics are as follows:

SYSTEM	DESIGN FLOW (gpm)	DESIGN HEAD (ft)	MINIMUM FLOW	SHUTOFF HEAD
LPSI	1500	403	200	450
CS	1700	450	200	500

Extensive analysis of these pump's vibration characteristics was performed in 1994, when Fort Calhoun Station (FCS) was first required to comply with these ASME OM Code vibration limits. That analysis was documented in the Reference 1 letter transmitted to the NRC. It was determined that the dominant contribution to this vibration during minimum Group A test conditions was incipient cavitation caused by operating a high energy pump with a corresponding low net positive suction head. Complying with the Table ISTB-5121-1 would cause unusual difficulty as those pumps normally exceed those vibration levels and have historically done so while providing reliable and safe service. A review of Inservice Test (IST) history to date has determined these pumps have never exceeded the Required Action limits of ISTB-5121-1 during Group A or Comprehensive Pump Tests (CPTs). The CPT Required Action levels of Table ISTB-5121-1 were not modified by relief request, thus during CPTs these pumps have not reached Required Action vibration or hydraulic levels even when normal Table ISTB-5121-1 limits are applied. As another measure of these pumps reliability, during the current 4th IST interval there have been no Maintenance Rule Functional Failures for any of the LPSI and CS pumps. Finally, during 2011 – 2013 while FCS was in an extended refueling outage internal inspections and pump refurbishment was performed for both LPSI (SI-1A and SI-1B) and 2 of three CS (SI-3B and SI-3C) pumps. The internal inspections revealed no abnormal accelerated degradation due to operating on mini-flow / Group A conditions. These were the only instances of LPSI / CS pump internal refurbishment during the 4th IST interval.

This 10 CFR 50.55a, paragraph (z)(2), relief is requested from the requirement of ASME OM Code Table ISTB-5121-1 Group A since compliance with absolute vibration limits would result in an unusual hardship (i.e., re-design of systems) without a commensurate increase in the level of quality or safety.

5. Proposed Alternative and Basis for Use

FCS will continue to adhere to the Table ISTB-5121-1 vibration limits during CPTs. During Group A testing, the $>.325$ in / sec Alert Range limit and the $>.070$ Required Action limit will be replaced with an Alert Range limit of $>.80$ in / sec and a Required Action limit of > 1.1 in / sec.

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Low Pressure Safety Injection and Containment Spray Pumps Vibration Limits
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Increase in Level of Quality or Safety--**

Using the provisions of this relief request as an alternative to the specific requirements of Table ISTB-5121-1 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. These pumps have performed reliably throughout their service life at these higher vibration levels with no history of significant degradation. Therefore, pursuant to 10 CFR 50.55a(z)(2), Ft. Calhoun Station requests relief from the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire fifth 120 month Inservice Test interval (June 7, 2016 – June 6, 2026). Note that the fourth interval was extended as documented in the Reference 2 letter.

7. Precedents

A similar 10 CFR 50.55a request was previously approved for the fourth 120 Month Interval at Ft. Calhoun Station as Pump Relief Request E5. That approval was documented in the Reference 3 NRC safety evaluation report (SER).

8. References

1. Letter from OPPD (W. G. Gates) to NRC (Document Control Desk), "Request for Relief from Vibration Limits for Quarterly Minimum Recirculation ISI Surveillance Tests of Low Pressure Safety Injection (LPSI) and Containment Spray Pumps," dated August 3, 1994.(LIC-94-0159)
2. Letter from OPPD (L. Cortopassi) to NRC (Document Control Desk), "Revised In-service Inspection (ISI) and In-service Test (IST) Interval End Dates as a Result of Extended Refueling Outage," dated January 21, 2014. (ML14022A258)
3. Letter from NRC (Stephen Dembeck) to OPPD (R. T. Ridenoure), "Safety Evaluation for the Fourth 10-Year Interval Inservice Inspection Plan – Fort Calhoun Station (TAC NO. MB7241)," dated February 19, 2004. (ML040570291)

**10 CFR 50.55a Request Number P-2
 Adjusting Hydraulic Parameters to Specified Reference Points per Code Case
 OMN-21**

**Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)
 --Alternative Provides an Acceptable Level of Quality and Safety--**

1. ASME Code Component(s) Affected

All pumps tested within the Fort Calhoun Station (FCS) Inservice Test (IST) program. A summary list of pumps currently included in that scope is provided below:

Pump Number	Description	Pump Type	ASME Code Class	OM Code Category
FW-6 & 10	Auxiliary Feedwater Pump	Centrifugal	3	B
AC-3A, 3B & 3C	Component Cooling Water Pump	Centrifugal	3	A
CH-1A, 1B & 1C	Charging Pump	Positive Displacement	2	A
CH-4A & 4B	Boric Acid Pump	Centrifugal	2	A
AC-10A, 10B, 10C & 10D	Raw Water Pump	Vertical Line Shaft	3	A
SI-1A & 1B	Low Pressure Safety Injection Pump	Centrifugal	2	A
SI-2A, 2B & 2C	High Pressure Safety Injection Pump	Centrifugal	2	B
SI-3A, 3B & 3C	Containment Spray Pump	Centrifugal	2	A
FO-4A-1 & 2, FO-4B-1 & 2	Diesel Fuel Oil Transfer Pumps	Positive Displacement	3	B

2. Applicable Code Edition and Addenda

ASME OM Code 2004 Edition through 2006 Addenda

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OMN-21**

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3. Applicable Code Requirements

ISTB-5121, "Group A Test Procedure", subparagraph (b) states in part: The system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5122, "Group B Test Procedure", subparagraph (c) states: The system resistance may be varied as necessary to achieve the reference point.

ISTB-5123, "Comprehensive Test Procedure", subparagraph (b) states, in part: For centrifugal and vertical line shaft pumps, the system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5221, "Group A Test Procedure", subparagraph (b) states, in part: The system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5222, "Group B Test Procedure", subparagraph (c) states: The system resistance may be varied as necessary to achieve the reference point.

ISTB-5223, "Comprehensive Test Procedure", subparagraph (b) states in part: The system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5321, "Group A Test Procedure", subparagraph (b) states in part: The resistance of the system shall be varied until the discharge pressure equals the reference point.

ISTB-5322, "Group B Test Procedure", subparagraph (c) states in part: System resistance shall be varied as necessary to achieve the reference point.

ISTB-5323, "Comprehensive Test Procedure", subparagraph (b) states in part: The resistance of the system shall be varied until the discharge pressure equals the reference point.

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (z)(1), an alternative is proposed to the pump testing reference value requirements of the ASME OM Code. The basis of the request is that the proposed alternative would provide an acceptable level of quality and safety. Specifically, this alternative is requested for all inservice testing of IST Program pumps identified above.

**10 CFR 50.55a Request Number P-2
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OMN-21**

**Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)
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For pump testing, there is difficulty adjusting system throttle valves with sufficient precision to achieve exact flow, differential pressure or discharge pressure to exact reference values during subsequent IST exams. Section ISTB of the ASME OM Code does not allow for variance from a fixed reference value for pump testing. However, NUREG-1482, Revision 2, Section 5.3, acknowledges that certain pump system designs do not allow for the licensee to set the flow, differential pressure or discharge pressure at an exact value because of limitations in the instruments and controls for maintaining steady flow.

ASME OM Code Case OMN-21 provides guidance for adjusting flow, differential pressure or discharge pressure to reference values within a specified tolerance during Inservice Testing. The Code Case states "It is the opinion of the Committee that when it is impractical to operate a pump at a specified reference point and adjust the resistance of the system to a specified reference point for either flow rate, differential pressure or discharge pressure, the pump may be operated as close as practical to the specified reference point with the following requirements. The Owner shall adjust the system resistance to as close as practical to the specified reference point where the variance from the reference point does not exceed plus 2% or minus 1% of the reference point when the reference point is flow rate, or plus 1% or minus 2% of the reference point when the reference point is differential pressure or discharge pressure".

5. Proposed Alternative and Basis for Use

FCS prefers to perform future Inservice Pump testing in a manner consistent with the requirements as stated in ASME OM Code Case OMN-21. Specifically, for those tests in which flow is adjusted to the Reference value, tests will be conducted such that flow rate is adjusted as close as practical to the reference value and within procedural limits of plus 2% / minus 1% of the reference value. Conversely, if the Reference parameter is differential pressure or discharge pressure, tests will be conducted such that differential pressure or discharge pressure is adjusted as close as practical to the reference value and within procedural limits of plus 1% / minus 2% of the reference value.

Code Case OMN-21 was approved by the ASME Operations and Maintenance Standards Committee on April 20, 2012. The applicability of Code Case OMN-21 is the ASME OM Code 1995 Edition through 2011 Addenda. The language from Code Case OMN-21 has been included in the ASME OM Code 2012 Edition.

Using the provisions of this request, as described above, as an alternative to the specific requirements of ISTB-5121, ISTB-5122, ISTB-5123, ISTB-5221, ISTB-5222, ISTB-5223, ISTB-5321, ISTB-5322 and ISTB-5323 will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

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**Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)
--Alternative Provides an Acceptable Level of Quality and Safety--**

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire fifth 120 month IST interval (June 7, 2016 – June 6, 2026). Note that this interval was extended as documented in letter from OPPD (L. Cortopassi) to NRC dated (Document Control Desk) dated January 21, 2014, (ML14022A258).

7. Precedents

Callaway Plant, Unit 1 – Safety Evaluation – Requests for Relief PR-01 through PR-06, Alternatives to ASME OM Code Requirements for Inservice Testing for the Fourth Program Interval (TAC Nos. MF2784, MF2785, MF2786, MF2787, MF2788 and MF2789) July 15, 2014. PR-06 requested use of Code Case OMN-21 for pump ISTs. This report may be found in ADAMS via accession number ML14178A769.