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

July 15, 2014

Mr. Fadi Diya
Senior Vice President and
Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT, UNIT 1 - 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)

Dear Mr. Diya:

By letter dated September 23, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13267A183), as supplemented by letter dated April 2, 2014 (ADAMS Accession No. ML14092A324), Union Electric Company (dba Ameren Missouri, the licensee) submitted requests for relief PR-01 through PR-06 to the NRC proposing alternatives to certain requirements of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), for the fourth 10-year inservice testing (IST) program interval. Your letter dated April 2, 2014, withdrew request for relief PR-05.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, paragraph 50.55a(a)(3)(i), the licensee requested to use the proposed alternatives in PR-01, PR-02, PR-03, and PR-06 on the basis that the alternatives provide an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee requested to use the proposed alternative in PR-04 on the basis that the ASME OM Code requirements present an undue hardship without a compensating increase in the level of quality or safety.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the subject requests and determined that for requests PR-01, PR-02, PR-03, and PR-06, the proposed alternatives provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(i) for requests PR-01, PR-02, PR-03, and PR-06, and is in compliance with the ASME OM Code requirements. Therefore, the NRC staff authorizes alternative requests PR-01, PR-02, PR-03, and PR-06 for Callaway Plant for the fourth 10-year IST program interval, which begins on December 20, 2014, and is scheduled to end on December 19, 2024.

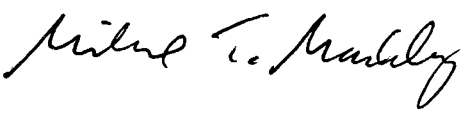
The NRC staff determines that for alternative request PR-04, the proposed alternative provides reasonable assurance that the affected components are operationally ready. The NRC staff concludes that complying with the specified ASME OM Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii), and is in compliance with the ASME OM Code requirements. Therefore, the NRC staff authorizes alternative request PR-04 for Callaway Plant for the fourth 10-year IST program interval, which begins on December 20, 2014, and is scheduled to end on December 19, 2024.

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

If you have any questions, please contact me at 301-415-2296 or via e-mail at fred.lyon@nrc.gov.

Sincerely,



Michael T. Markley, Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEF PR-01 THROUGH PR-06 RELATED TO THE

INSERVICE TESTING PROGRAM FOR THE FOURTH 10-YEAR INTERVAL

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By letter dated September 23, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13267A183), as supplemented by letter dated April 2, 2014 (ADAMS Accession No. ML14092A324), Union Electric Company, the licensee, submitted alternative requests PR-01, PR-02, PR-03, PR-04, PR-05, and PR-06 to the U.S. Nuclear Regulatory Commission (NRC). In its letter dated April 2, 2014, the licensee withdrew alternative request PR-05. The licensee proposed alternatives to certain inservice testing (IST) requirements of the American Society of Mechanical Engineers *Code for Operation and Maintenance of Nuclear Power Plants* (ASME OM Code), for the IST program at Callaway Plant, Unit 1 (Callaway) for the fourth 10-year IST program interval, which begins on December 20, 2014, and is scheduled to end on December 19, 2024.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, paragraph 50.55a(a)(3)(i), the licensee requested to use the proposed alternatives in PR-01, PR-02, PR-03, and PR-06 on the basis that the alternatives provide an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee requested to use the proposed alternative in PR-04 on the basis that the ASME OM Code requirements present an undue hardship without a compensating increase in the level of quality or safety.

2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.55a(f), "Inservice testing requirements," state, 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.

The regulations in 10 CFR 50.55a(a)(3), state, in part, that alternatives to the requirements in paragraph (f) of 10 CFR 50.55a may be authorized by the NRC if the licensee demonstrates that: (i) the proposed alternative provides an acceptable level of quality and safety, or

(ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The Callaway fourth 10-year IST interval begins on December 20, 2014, and is scheduled to end on December 19, 2024. The fourth interval IST program Code of record is the ASME OM Code, 2004 Edition with Addenda through OMb-2006 Addenda.

Based on the above, and subject to the NRC's findings with respect to authorizing the proposed alternatives to the ASME OM Code given below, the NRC staff concludes that regulatory authority exists for the licensee to request and the Commission to authorize the alternatives requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Alternative Request PR-01

ISTB-3510, "Data Collection General," (b), "Range," (1) states that

> The full-scale range of each analog instrument shall be not greater than three times the reference value.

The licensee requested to use alternative instrument range requirements for Residual Heat Removal (RHR) pumps PEJ01A and PEJ01B. The pumps are classified as ASME Code Class 2 and ASME OM Code Group A.

Reason for Request

In its letter dated September 23, 2013, the licensee stated, in part, that

> The range of the installed analog discharge pressure gauge for the RHR pumps is 0 – 700 [pounds per square inch gauge (psig)]. Because the reference values for pump discharge pressure during Inservice Testing are between 200 psig and 300 psig, the instrument range exceeds the requirement of ISTB-3510(b)(1).
>
> Pump discharge pressure indication is used along with pump suction pressure indication to determine pump differential pressure. Discharge pressure reference values for the RHR pumps during Inservice Testing are between 200 psig and 300 psig. Based on ISTB-3510(b)(1), this would require as a maximum, a gauge with a range of 0 to 600 psig (3 * 200 psig) to bound the lowest reference value for discharge pressure. Applying the accuracy requirement of ± 2% for the Group A test, the resulting inaccuracies due to discharge pressure effects would be ± 12.0 psig (0.02 * 600 psig).

Proposed Alternative

In its letter dated September 23, 2013, the licensee stated, in part, that

> As an alternative for the Group A test, Callaway Nuclear Plant will use the installed discharge pressure analog gauge (0 to 700 psig) calibrated to less than or equal to ± 1.7 % such that the inaccuracies due to pressure will be less than those required by the [ASME OM] Code (± 12.0 psig). The error associated with the discharge gauge would then be no greater than +/- 11.9 [pounds per square inch (psi)] (700 * 0.017). Use of the installed pressure gauge calibrated in this manner is equivalent in terms of measuring discharge pressure to less than +/- 2%.

NRC Staff Evaluation

The licensee requests an alternative to the ASME OM Code instrumentation requirements of paragraph ISTB-3510(b)(1) for the pressure gauge that is used to measure the discharge pressure of RHR pumps PEJ01A and PEJ01B. ASME OM Code paragraph ISTB-3510(b)(1) requires that the full-scale range of each instrument be no greater than three times the reference value. The licensee proposes to use the installed discharge pressure gauge that does not meet this requirement.

The installed discharge pressure gauge for the RHR pumps has a range of 0-700 psig. The typical discharge pressure reference values for the RHR pumps during testing are 200-300 psig. The NRC staff agrees that the use of 200 psig to calculate a conservative reading error is appropriate for these pumps. Therefore, the effective gauge accuracy of the installed pressure gauge when calibrated to less than or equal to ± 1.7 percent is 5.95 percent, which is less than the resulting measurement accuracy of ± 6 percent for Group A tests if ASME OM Code requirements were met. This request for alternative applies only to Group A testing of RHR pumps PEJ01A and PEJ01B.

Table 1 contains details related to the RHR pump discharge pressure gauge as provided by the licensee, the ASME OM Code requirements, and notes pertaining to the NRC staff's evaluation. The use of the existing gauges is supported by NUREG-1482, Revision 2, Paragraph 5.5.1, when the combination of range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the ASME OM Code requirements. The RHR pumps' discharge pressure gauge yields readings at least equivalent to the readings achieved from instruments that meet ASME OM Code requirements for Group A tests as required in ISTB-3510(b)(1). Therefore, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety because the installed instrumentation provides a measurement accuracy that exceeds the resulting measurement accuracy of ± 6 percent for Group A tests if ASME OM Code requirements were met.

Table 1: Pump and Gauge Information for Alternative Request PR-01

Items	RHR Pumps: Discharge	Remark
Pump No.	PEJ01A, PEJ01B	
Type of Inservice Test	Group A Test	
Discharge Pressure Gauge Range (psig)	0-700	

Items	RHR Pumps: Discharge	Remark
Discharge Reference Value Range (psig)	200-300	
Three times the Reference Value	(3 x 200) = 600 psig	Note 1
Effective Gauge Accuracy of Installed Instrument if Calibrated to ± 1.7%	(± 1.7%) of (700/200) = ± 5.95%	
Actual Accuracy of Instrument that Meets ASME OM Code Requirements for Group A Testing	(± 2%) x (600/200)= ± 6%	
Acceptable Alternative to the ASME OM Code Requirement for Group A Testing	Yes	
Note 1: Actual reference value range is between 200 and 300 psig; 200 psig is used for conservative results.		

3.2 Licensee's Relief Request PR-02

ISTB-3510, "Data Collection General," (b), "Range," (1) states that

> The full-scale range of each analog instrument shall be not greater than three times the reference value.

The licensee requested to use alternative instrument range requirements for centrifugal charging pumps PBG05A and PBG05B. The pumps are classified as ASME Code Class 2 and ASME OM Code Group B.

Reason for Request

In its letter dated September 23, 2013, the licensee stated, in part, that

> The range of the installed suction pressure gauges for the centrifugal charging pumps is 0 – 150 psig. Because the reference values for suction pressure during Inservice Testing are between 30 psig and 40 psig, the instrument range exceeds the requirement of ISTB-3510(b)(1).
>
> Pump suction pressure indication is used along with pump discharge pressure indication to determine pump differential pressure. Suction pressure reference values for the centrifugal charging pumps during Inservice Testing are between 30 psig and 40 psig. Based on ISTB-3510(b)(1), this would require as a maximum, a gauge with a range of 0 to 90 psig (3 X 30 psig) to bound the lowest reference value for pressure. Applying the accuracy requirement of ± 2 % for the quarterly Group B pump test, the resulting inaccuracies due to suction pressure effects would be ± 1.8 psig (0.02 X 90 psig).

Proposed Alternative

For the Group B quarterly test, the licensee will use the installed suction pressure gauge calibrated to less than or equal to ± 1.2 percent, such that the inaccuracies due to suction pressure will be less than that required by the ASME OM Code (± 1.8 psig). The error

associated with the suction gauge would then be no worse than ± 1.8 psi (150 * .012). The use of the installed suction pressure gauge calibrated to less than ± 2 percent is equivalent in terms of ASME OM Code compliance for the measurement of suction pressure.

NRC Staff Evaluation

The licensee requests an alternative to the ASME OM Code instrumentation requirements of paragraph ISTB-3510(b)(1) for the pressure gauges that are used to measure the suction pressure of centrifugal charging pumps PBG05A and PBG05B. ASME OM Code paragraph ISTB-3510(b)(1) requires that the full-scale range of each instrument be no greater than three times the reference value. The licensee proposes to use the installed suction pressure gauges that do not meet this requirement.

The installed suction pressure gauges for the centrifugal charging pumps have a range of 0-150 psig. The typical suction pressure reference values for the centrifugal charging pumps during testing are 30-40 psig. The NRC staff agrees that the use of 30 psig to calculate a conservative reading error is appropriate for these pumps. Therefore, the effective gauge accuracy of the installed pressure gauge when calibrated to less than or equal to ± 1.2 percent is 6 percent, which is equal to the resulting measurement accuracy of ± 6 percent for Group B tests if ASME OM Code requirements were met. This request for alternative applies only to Group B testing of centrifugal charging pumps PBG05A and PBG05B.

Table 2 contains details related to the centrifugal charging pump suction pressure gauges as provided by the licensee, the ASME OM Code requirements, and notes pertaining to the NRC staff's evaluation. The use of the existing gauges is supported by NUREG-1482, Revision 2, Paragraph 5.5.1, when the combination of range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the ASME OM Code requirements. The centrifugal charging pumps' suction pressure gauges yield readings at least equivalent to the readings achieved from instruments that meet ASME OM Code requirements for Group B tests as required in ISTB-3510(b)(1). Therefore, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety because the installed instrumentation provides a measurement accuracy that equals the resulting measurement accuracy of ± 6 percent for Group B tests if ASME OM Code requirements were met.

Table 2: Pump and Gauge Information for Alternative Request PR-02

Items	Centrifugal Charging Pumps: Suction	Remark
Pump No.	PBG05A, PBG05B	
Type of Inservice Test	Group B Test	
Suction Pressure Gauge Range (psig)	0-150	
Suction Reference Value Range (psig)	30-40	
Three times the Reference Value	(3 x 30) = 90 psig	Note 1
Effective Gauge Accuracy of Installed Instrument if Calibrated to ± 1.2%	(± 1.2 %) of (150/30) = ± 6 %	

Items	Centrifugal Charging Pumps: Suction	Remark
Actual Accuracy of Instrument that Meets ASME OM Code Requirements for Group A Testing	(± 2 %) x (90/30)= ± 6 %	
Acceptable Alternative to the ASME OM Code Requirement for Group A Testing	Yes	
Note 1: Actual reference value range is between 30 and 40 psig; 30 psig is used for conservative results.		

3.3 Licensee's Alternative Request PR-03

ISTB-5121, "Group A Test Procedure," (c) states that

> Where it is not practical to vary system resistance, flow rate and pressure shall be determined and compared to their respective reference values.

Table ISTB-3000-1, "Inservice Test Parameters," indicates which parameters must be measured for the preservice, Group A, Group B, and comprehensive tests.

The licensee has proposed an alternative to the requirements of ISTB-5121. The components affected by this alternative request are boric acid transfer pumps PBG02A and PBG02B. The pumps are classified as Group A pumps in the IST program.

Reason for Request

The normal test loop for the boric acid transfer pumps is suction from the boric acid tank and discharge through a mini-flow recirculation line back to the boric acid tank. There is no flow measuring instrumentation installed in this flow path. The mini-flow recirculation line has a locked throttle valve BGV209(210) that is set to allow for a minimum pump recirculation flow of approximately 15 gallons per minute (gpm). This throttle valve allows minimum recirculation flow to protect the pump and allows adequate flow to the charging system to allow for immediate boration in emergency conditions. Adjusting the throttle valve for the quarterly IST could potentially allow for the mis-positioning of the valve and could potentially have an adverse effect on the system's capability. Since the locked throttle valve will not be adjusted, the test loop is considered to be a fixed resistance flow path.

The main flow path is an alternate test circuit, but this flow path would require the injection of boric acid into the reactor coolant system, which would create severe power level fluctuations that could cause a reactor trip.

Proposed Alternative

In its letter dated September 23, 2013, the licensee stated, in part, that

> As an alternative to measuring differential pressure and flow during the Group A quarterly test, only the differential pressure will be measured and compared to its reference value. Additionally, vibration measurements are also recorded and

compared to their reference values. The Group A test will be performed using the [minimum flow recirculation path] shown in Figure 1, with the throttle valve [BGV209(210)] remaining in its locked position. The reference value is approximately 112 psig at an estimated flow rate of 15 gpm. Because the system resistance is fixed and flow can be assumed to be constant, pump degradation may be detected by comparing successive measurements of pump differential pressure. Based on this, it is not warranted to install additional instrumentation to provide for flow measurement.

During the comprehensive inservice test when flow may be measured, full-spectrum vibration analysis will be performed which is beyond the vibration analysis required by the ASME OM Code. The vibration measurements will be recorded and compared to their reference values. Thus, when performing the comprehensive pump test, all required parameters will be measured and compared to their reference values. The performance of full spectrum analysis, in addition to continued quarterly and comprehensive testing, will ensure that an accurate assessment of pump health and operational readiness is determined.

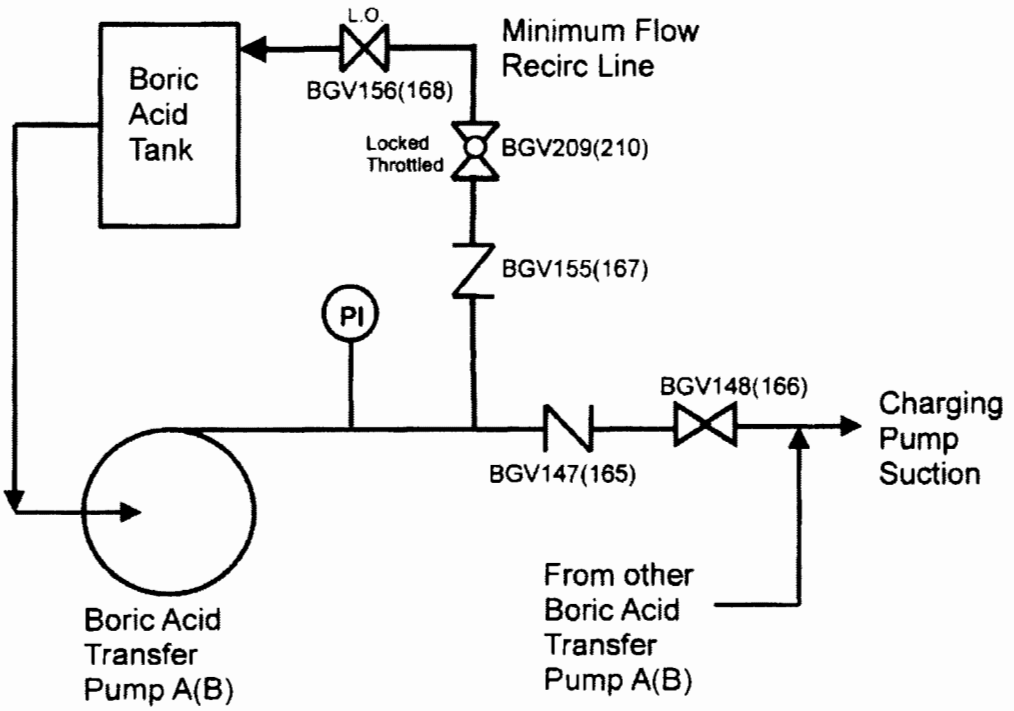


Figure 1

NRC Staff Evaluation

The licensee requested an alternative to the ASME OM Code Group A pump test requirements of paragraph ISTB-5121(c) for flow rate and pressure measurement of the boric acid transfer pumps. Paragraph ISTB-5121(c) requires that, where it is not practical to vary system resistance, flow rate and pressure shall be determined and compared to their respective

reference values. The licensee's proposal to measure only the differential pressure does not meet these requirements.

Pump differential pressure and flow rate are two parameters that are measured and evaluated together to determine pump hydraulic performance. However, the minimum flow return lines at Callaway used for quarterly Group A testing of the boric acid transfer pumps are of fixed resistance due to the locked valves BGV209 and BGV210, do not provide the ability to vary flow rate, and are not instrumented for flow rate. As an alternative to measuring differential pressure and flow during the Group A test, the licensee proposed that only the differential pressure will be measured and compared to its reference value. The differential pressure reference value is approximately 112 psig at a flow rate of 15 gpm. Measurement of the boric acid pump differential pressure and a comparison to the reference value, along with vibration measurement during Group A testing, will provide assessment of the pump performance. This alternative request applies only to Group A testing of boric acid transfer pumps PBG02A and PBG02B.

During Group A testing, vibration measurements are also recorded and compared to their reference values as required by the ASME OM Code. Also, during the biennial comprehensive inservice test, all required parameters are measured and compared to their reference values. In addition, a full-spectrum vibration analysis will be performed during the comprehensive test, which is beyond the vibration analysis required by the ASME OM Code.

In response to NRC request for additional information (RAI) PR-03-01 dated March 5, 2014 (ADAMS Accession No. ML14059A345), the licensee stated that the installation of permanently installed flow instrumentation would require a costly modification. The best location in the boric acid transfer piping for a temporary ultrasonic flow meter (UFM) has numerous instrument lines that would interfere with access to the location. Also, the licensee would have to implement new and more costly calibration requirements for the UFM equipment.

In response to RAI PR-03-02 dated March 5, 2014, the licensee submitted pump curves for the boric acid transfer pumps. At a flow rate of 15 gpm for the proposed Group A test, there is slope in the pump curves, but not as much as at the comprehensive pump flow rate of 75 gpm. However, since the pump flow rate of 15 gpm is essentially fixed, pump degradation can be detected.

The NRC staff concludes that the licensee's proposed alternative to test the boric acid transfer pumps by measuring the differential pressure and comparing it to the reference value, as discussed above, provides an acceptable level of quality and safety.

3.4 Licensee's Alternative Request PR-04

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

ISTA-3120, "Inservice Examination and Test interval," (a) states that

> The frequency for the inservice testing shall be in accordance with the requirements of Section IST.

ISTB-3400, "Frequency of Inservice Tests," states that

> An inservice test shall be run on each pump as specified in Table ISTB-3400-1.

ISTC-3510, "Exercising Test Frequency," states that

> Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 mo, except as provided by paras. ISTC-3520, ISTC-3540, ISTC-3550, ISTC-3570, ISTC-5221, and ISTC-5222. Power-operated relief valves shall be exercise tested once per fuel cycle.

ISTC-3540, "Manual Valves," states, in part, that

> Manual valves shall be full-stroke exercised at least once every 2 yr, except where adverse conditions may require the valve to be tested more frequently to ensure operational readiness.

ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," (a),"Frequency," states that

> Tests shall be conducted at least once every 2 yr.

ISTC-3700, "Position Verification Testing," states, in part, that

> Valves with remote position indicators shall be observed locally at least once every 2 yr to verify that valve operation is accurately indicated.

ISTC-5221, "Valve Obturator Movement," (c)(3) states that

> At least one valve from each group shall be disassembled and examined at each refueling outage; all valves in each group shall be disassembled and examined at least once every 8 yr.

Appendix I, I-1320, "Test Frequencies, Class 1 Pressure Relief Valves," (a), "5-Yr Test Interval," states, in part, that

> Class 1 pressure relief valves shall be tested at least once every 5 yr, starting with initial electric power generation.

Appendix I, I-1330, "Test Frequency, Class 1 Nonreclosing Pressure Relief Devices," states that

> Class 1 nonreclosing pressure relief devices shall be replaced every 5 yr unless historical data indicates a requirement for more frequent replacement.

Appendix I, I-1340, "Test Frequency, Class 1 Pressure Relief Valves That Are Used for Thermal Relief Application," states that

> Tests shall be performed in accordance with para. I-1320, Test Frequencies, Class 1 Pressure Relief Valves.

Appendix I, I-1350, "Test Frequency, Classes 2 and 3 Pressure Relief Valves," (a), "10-Yr Test Interval," states, in part, that

> Classes 2 and 3 pressure relief valves, with the exception of PWR [pressurized-water reactor] main steam safety valves, shall be tested every 10 yr, starting with initial electric power generation.

Appendix I, I-1360, "Test Frequency, Classes 2 and 3 Nonreclosing Pressure Relief Devices," states that

> Classes 2 and 3 nonreclosing pressure relief devices shall be replaced every 5 yr, unless historical data indicates a requirement for more frequent replacement.

Appendix I, I-1370, "Test Frequency, Classes 2 and 3 Primary Containment Vacuum Relief Valves," (a) states that

> Tests shall be performed on all Classes 2 and 3 containment vacuum relief valves at each refueling outage or every 2 yr, whichever is sooner, unless historical data requires more frequent testing.

Appendix I, I-1380, "Test Frequency, Classes 2 and 3 Vacuum Relief Valves, Except for Primary Containment Vacuum Relief Valves," states that

> All Classes 2 and 3 vacuum relief valves shall be tested every 2 yr, unless performance data suggest the need for a more appropriate test interval.

Appendix I, I-1390, "Test Frequency, Classes 2 and 3 Pressure Relief Devices That Are Used for Thermal Relief Application," states, in part, that

> Tests shall be performed on all Classes 2 and 3 relief devices used in thermal relief application every 10 yr, unless performance data indicate more frequent testing is necessary.

Appendix II, II-4000, "Condition-Monitoring Activities," (a), "Performance Improvement Activities," (1) states that

> If sufficient information is not currently available to complete the analysis required in section II-3000, or if this analysis is inconclusive, then the following activities shall be performed at sufficient intervals over an interim period of the next 5 yr or two refueling outages, whichever is less, to determine the cause of the failure or the maintenance patterns.

Appendix II, II-4000, "Condition Monitoring Activities," (b), "Optimization of Condition-Monitoring Activities," (1)(e) states, in part, that

> Interval extensions shall be limited to one fuel cycle per extension. Intervals shall not exceed the maximum intervals shown in Table II-4000-1.

Reason for Request

In its letter September 23, 2013, the licensee state, in part, that

> ASME OM Code Section IST establishes the inservice test frequency for all components within the scope of the ASME OM Code. The frequencies (e.g., quarterly) have always been interpreted as "nominal" frequencies (generally as defined in Table 3.2 of NUREG-1482, Revision 1[*]) and owners routinely applied the surveillance extension time period (i.e., grace period) contained in the plant Technical Specification (TS) Surveillance Requirements (SRs). The TSs typically allow for a less than or equal to 25% extension (via SR 3.0.2) of the surveillance test interval to accommodate plant conditions that may not be suitable for conducting the surveillance. However, regulatory issues have been raised concerning the applicability of the TS grace period to ASME OM Code-required IST frequencies irrespective of allowances provided under TS Administrative Controls (i.e., TS 5.5.8, "Inservice Testing Program," invokes SR 3.0.2 for various OM Code frequencies.).
>
> The lack of a tolerance band on the ASME OM Code IST frequencies restricts operational flexibility. [There may be a conflict where IST could be required (i.e., the frequency could expire), but the plant operating conditions may not be suitable for performance of the required testing.] The NRC recognized this potential issue in the [TSs] by allowing a frequency tolerance as described in TS SR 3.0.2. The lack of a similar tolerance applied to the 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].
>
> Interval 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). Such extensions are not intended to be used repeatedly merely as an operational convenience to extend test intervals beyond those specified.

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* U.S. Nuclear Regulatory Commission, NUREG-1482, Revision 1, "Guidelines for Inservice Testing at Nuclear Power Plants," August 2011 (ADAMS Accession No. ML050550290).

Proposed Alternative

The licensee proposes to adopt ASME OM Code Case OMN-20, "Inservice Test Frequency," which was published in conjunction with ASME OM Code, 2012 Edition. The purpose of this code case is to prescribe a methodology for determining acceptable tolerances for pump and valve test frequencies. This alternative will apply to the various frequency specifications of the ASME OM Code for all pumps and valves contained within the IST Program scope.

NRC Staff Evaluation

ASME OM Code Case OMN-20 provides alternative requirements to the test frequencies for pumps and valves specified in ASME OM Code, Division 1, Section IST and all earlier editions and addenda in the form of test frequency grace. The test frequency grace described in ASME OM Code Case OMN-20 is broken into the following two categories:

(a) Components whose test frequencies are based on elapsed time periods shall be tested at the frequencies specified in Section IST with a specified time period between tests as shown in [Table 3 below]. The specified time period between tests may be reduced or extended as follows:

1) For periods specified as fewer than 2 yr, the period may be extended by up to 25% for any given test.

2) For periods specified as greater than or equal to 2 yr, the period may be extended by up to 6 mo 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).

(b) Components whose test frequencies are based on the occurrence of plant conditions or events may not have their period between tests extended except as allowed by ASME OM, Division 1, Section IST, 2009 Edition through OMa-2011 Addenda and all earlier editions and addenda.

Table 3: Specified Test Frequencies [from ASME OM Code Case OMN-20]

Frequency	Specified Time Period Between Tests
Quarterly (or every 3 mo)	92 days
Semi-annually (or every 6 mo)	184 days
Annually (or every year)	366 days
x years	x calendar years where x is a whole number of years ≥ 2

ASME OM Code Case OMN-20 also states, in part, that:

> 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 fewer than 2-yr year test frequencies not specified in [Table 3].
>
> 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.

Historically, licensees have applied and the NRC staff has accepted the standard TS definitions for IST intervals (including allowable interval extensions) to ASME OM Code required testing as discussed in NUREG-1482 Revision 2, Section 3.1.3. Recently, the NRC staff reconsidered the allowance of using TS testing intervals and interval extensions for IST not associated with TS SRs. As noted in Regulatory Issue Summary (RIS) 2012-10, "NRC Staff Position on Applying Surveillance Requirements 3.0.2 and 3.0.3 to Administrative Controls Program Tests," dated August 23, 2012 (ADAMS Accession No. ML12079A393), the NRC determined that programmatic test frequencies cannot be extended in accordance with the TS SR 3.0.2. This includes all IST described in the ASME OM Code not specifically required by the TS SRs.

Following this development, the NRC staff sponsored and co-authored an ASME OM Code inquiry and Code Case to modify the ASME OM Code to include TS-like test interval definitions and interval extension criteria. The resultant Code Case OMN-20, as discussed above, was approved by the ASME Operation and Maintenance Standards Committee on February 15, 2012, with the NRC representative voting in the affirmative. Code Case OMN-20 was subsequently published in conjunction with the ASME OM Code, 2012 Edition. The licensee proposes to adopt Code Case OMN-20.

Requiring the licensee to meet the ASME OM Code requirements, without an allowance for defined frequency and frequency extensions for IST of pumps and valves, results in a hardship without a compensating increase in the level of quality and safety. Based on the prior acceptance by the NRC staff of the similar TS test interval definitions and interval extension criteria, the staff concludes that implementation of the test interval definitions and interval extension criteria contained in ASME OM Code Case OMN-20 is acceptable. The NRC staff concludes that the licensee's use of Code Case OMN-20 provides reasonable assurance of operational readiness of pumps and valves subject to the ASME OM Code IST.

3.5 Licensee's Alternative Request PR-06

ISTB-5121, "Group A Test Procedure," (b) states, in part, that

> The resistance of the system shall be varied until the flow rate equals the reference point.

ISTB-5122, "Group B Test Procedure," (c) states, in part, that

> System resistance may be varied as necessary to achieve the reference point.

ISTB-5123, "Comprehensive Test Procedure," (b) states, in part, that

> For centrifugal and vertical line shaft pumps, the resistance of the system shall be varied until the flow rate equals the reference point.

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

> The resistance of the system shall be varied until the flow rate equals the reference point.

ISTB-5222, "Group B Test Procedure," (c) states that

> System resistance may be varied as necessary to achieve the reference point.

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

> The resistance of the system shall be varied until the flow rate equals the reference point.

The licensee has requested an alternative to the pump testing reference value requirements of ISTB-5121, ISTB-5122, ISTB-5123, ISTB-5221, ISTB-5222, and ISTB-5223. The components affected by this alternative request are the pumps listed in Table 4 below.

Table 4: Pumps Affected by Alternative Request PR-06

Pump Number	Description	Pump Type	ASME Code Class	ASME OM Code Category
PAL01A/B	Motor Driven Auxiliary Feedwater Pumps	Centrifugal	3	Group A
PBG02A/B	CVCS Boric Acid Transfer Pumps	Centrifugal	3	Group A
PEF01A/B	Essential Service Water Pumps	Vertical Line Shaft	3	Group A
PEG01A/B/C/D	Component Cooling Water Pumps	Centrifugal	3	Group A
PEJ01A/B	Residual Heat Removal Pumps	Centrifugal	2	Group A

Pump Number	Description	Pump Type	ASME Code Class	ASME OM Code Category
PAL02	Turbine Driven Auxiliary Feedwater Pump	Centrifugal	3	Group B
PBG05A/B	Centrifugal Charging Pumps	Centrifugal	2	Group B
PEM01A/B	Safety Injection Pumps	Centrifugal	2	Group B
PEN01A/B	Containment Spray Pumps	Centrifugal	2	Group B

Reason for Request

The licensee stated that for pump testing, there is difficulty adjusting system throttle valves with sufficient precision to achieve exact flow reference values during subsequent IST exams, and that Section ISTB of the ASME OM Code does not allow for variance from a fixed reference value for pump testing. The licensee also notes that NUREG-1482, Revision 1, Section 5.3, acknowledges that certain pump system designs do not allow for the licensee to set the flow at an exact value because of limitations in the instruments and controls for maintaining steady flow.

Proposed Alternative

The licensee has proposed the use of ASME OM Code Case OMN-21 as an alternative to the pump testing reference value requirements of the ASME OM Code for the pumps listed in Table 4. ASME OM Code Case OMN-21 provides guidance for adjusting reference flow or differential pressure to within a specified tolerance for pump inservice testing.

ASME OM Code Case OMN-21 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 + 2% or - 1% of the reference point when the reference point is flow rate, or + 1% or - 2% of the reference point when the reference point is differential pressure or discharge pressure.

The licensee seeks to perform future inservice pump testing in a manner consistent with the requirements as stated in ASME OM Code Case OMN-21 for the pumps listed in Table 4. The licensee states that testing will be performed such that flow rate is adjusted as close as practical to the reference value and within proceduralized limits of +2 percent / -1 percent of the reference value for those pumps identified in Table 4. The licensee states that plant operators will still strive to achieve the exact test flow reference values during testing and that if the reference value cannot be achieved with reasonable effort, the test will be considered valid if the steady state flow rate is within the proceduralized limits of +2 percent / -1 percent of the reference value for those pumps identified in Table 4.

NRC Staff Evaluation

An inquiry was submitted to the ASME OM Code to determine what alternatives may be used when it is impractical to operate a pump at a specified reference point for either flow rate, differential pressure, or discharge pressure. ASME Code Case OMN-21 was developed to provide guidance on alternatives. The guidance in Code Case OMN-21 states that when it is impractical to operate a pump at 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. Code Case OMN-21 specifies that the variance from the reference point shall not exceed +2 percent or -1 percent of the reference point when the reference point is flow rate, or +1 percent or -2 percent of the reference point when the reference point is differential pressure or discharge pressure.

Code Case OMN-21 was approved by the ASME Operation and Maintenance Standards Committee on April 20, 2012, with the NRC representative voting in the affirmative. The licensee proposes to adopt Code Case OMN-21. The applicability of Code Case OM-21 is the ASME OM Code 1995 Edition through the 2011 Addenda. The NRC staff notes that the language from Code Case OMN-21 has been included in the ASME OM Code, 2012 Edition.

The NRC staff notes that in certain situations, it is not possible to operate a pump at a precise reference point. The NRC staff has reviewed the alternatives proposed in ASME OM Code Case OMN-21 and found that the proposed alternatives are reasonable and appropriate when a pump cannot be operated as a specified reference point. Operation within the tolerance bands specified in ASME OM Code Case OMN-21 provides reasonable assurance that licensees will be able to utilize the data collected to detect degradation of the pumps. Based on the NRC staff's review of ASME OM Code Case OMN-21 and the licensee's commitment to use the bands specified in ASME OM Code Case OMN-21 for flow rate, the NRC staff concludes that implementation of the alternatives contained in ASME OM Code Case OMN-21 is acceptable for the pumps listed in Table 4. Therefore, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff determines that for alternative requests PR-01, PR-02, PR-03, and PR-06 for Callaway, the proposed alternatives provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(i) for requests PR-01, PR-02, PR-03, and PR-06 for Callaway, and is in compliance with the ASME OM Code requirements. Therefore, the NRC staff authorizes alternative requests PR-01, PR-02, PR-03, and PR-06 for Callaway for the fourth 10-year IST program interval, which begins on December 20, 2014, and is scheduled to end on December 19, 2024.

As set forth above, the NRC staff determines that for alternative request PR-04, the proposed alternative provides reasonable assurance that the affected components are operationally ready. The NRC staff concludes that complying with the specified ASME OM Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii), and is in

compliance with the ASME OM Code requirements. Therefore, the NRC staff authorizes alternative request PR-04 for Callaway for the fourth 10-year IST program interval, which begins on December 20, 2014, and is scheduled to end on December 19, 2024.

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

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Date: July 15, 2014

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii), and is in compliance with the ASME OM Code requirements. Therefore, the NRC staff authorizes alternative request PR-04 for Callaway Plant for the fourth 10-year IST program interval, which begins on December 20, 2014, and is scheduled to end on December 19, 2024.

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

If you have any questions, please contact me at 301-415-2296 or via e-mail at fred.lyon@nrc.gov.

Sincerely,

/RA/

Michael T. Markley, Chief
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Office of Nuclear Reactor Regulation

Docket No. 50-483

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